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PHILADELPHIA, JULY 6, 1878.

ORIGINAL COMMUNICATIONS.

NOTE ON THE EFFECTS OF PRESSURE ON THE IRRITABILITY OF NERVE-TRUNKS.

BY ROBERT MEADE SMITH, A.M., M.D.

THE fact that pressure on the trunk of a nerve may destroy its power of conducting impressions, and that this function may return upon removal of pressure, received its first experimental confirmation in the observations of Bastian and Vulpian in 1855 (*Gazette Méd. de Paris*, 1855, p. 794), and of Aug. Waller in 1862 (Proc. Royal Soc., 1862).

These observers, experimenting on the effects of rapid compression of their own nerves and those of others, noticed among the first symptoms a condition of hyperæsthesia of the region supplied by the nerve, soon, however, giving place to local anæsthesia and muscular palsy; when the pressure was removed, muscular contractility and sensibility gradually returned. In these experiments, however, the sole test of the degree of disturbance of function consisted in the degree in which the muscles obeyed the mandates of the will, and the sensations evident to the person experimented upon. It is evident, therefore, that before these experiments can be accepted as explaining the effects of pressure on the *nerves alone*, several elements necessarily involved in the mode of producing pressure (pressing the arm over the back of a chair, etc.) would have to be eliminated; otherwise it would be difficult to explain the fact, noticed by Waller and confirmed by Mitchell, that the paralysis consequent upon pressure in the trunk of a motor nerve was not confined to the muscles in which that nerve was distributed. So, also, it would be difficult to decide from these observations whether the hyperæsthetic condition observed was owing to a condition of exalted irritability of the nerve ends, directly due to pressure on its trunk, or whether the pressure itself acted as an irritant, or again whether it was due to circulatory disturbances.

The fact that pressure on the trunk of a nerve may increase its excitability appears to be generally assumed, though I have been able to find no experimental demonstration of the fact other than the questionable investigations above alluded to. Harless (*Zeitschrift für Rat. Med.*, Bd. vii. p. 219), in his experiments made to determine the effects of different currents of air on the irritability of nerves, has explained the increase following the drying of the nerve by warm currents as due to pressure of the coats of the nerves upon their contents, the coats shrinking from evaporation of their water; but I have been unable to see that he has made any direct experiments to substantiate this view, although he is quoted as having done so by Funke (Physiologie, erster Band). While, then, the condition of the peripheral portion of a nerve whose trunk has been subjected to pressure seems still to admit of investigation, the experiments of Dr. S. Weir Mitchell (Injuries to Nerves, p. 111) have established beyond a doubt that the nerves in warm-blooded animals whose conductivity has been destroyed by continued compression may regain that power on removal of the pressure.

In the first series of my experiments made to determine the influence of pressure on the irritability of different portions of the motor nerves, the animals (frogs) were first killed by destroying the brain and spinal cord; one of the sciatic nerves was then carefully dissected out from the knee up to the spinal column, which was divided transversely above the origin of the three nerves which go to make up the sciatic; the vertebral fragment was then bisected, each half serving as a support by means of which the nerve can be freed from its attachments without handling. The muscles were then cleared away from the femur, which was divided in its upper third, and the tibia and fibula removed below the knee, after having cut across the tendo Achillis, and freed the gastrocnemius up to its femoral origin. The femur of the "nerve-muscle preparation" was then clamped to a brass support in Pflüger's moist chamber, so as to allow the muscle to hang perpendicularly, while the tendon was attached by a Kronecker forceps and silk thread, through a slit in the bottom of the chamber, to the lever of a Marey sphygmograph, which, in the want of anything better, could serve as a recording apparatus for the muscle-curves. The nerve was then placed in a horizontal

position on two pair of Donders's modification of Dubois-Reymond's non-polarizable electrodes, one pair being near the muscle end, the other near the spine, care being taken that an equal nerve-surface in each case rested upon the electrodes. I employed two forms of non-polarizable electrodes, one consisting simply of a section of glass tube, about an inch and a half long, plugged at one end with a putty made from moulder's clay moistened with a .75 per cent. solution of chloride of sodium, the plug projecting from the end and bent round so as to form a right angle with the rest of the tube. The tube itself contained a few drops of a saturated solution of sulphate of zinc, into which dipped the amalgamated end of a strip of zinc, covered in the greater part of its length with varnish and connected by its other end with the copper battery-wire. In the other form the tube was drawn out to a point, and then bent round so as to form a horse-shoe, in the concave surface of which a small hole was drilled. The bent end of the tube was then filled with clay, which only, however, came in contact with the nerve through the hole. Greater accuracy can be attained through the use of this second form of electrodes: since the tubes, being easily made of the same size and angle, can be made to contain exactly the same amount of clay, and so furnish an equal resistance to the passage of the electric current, while the uniform size of the holes drilled in them insures the apposition of equal areas of nerve-surface to the conductors. Between the two pair of electrodes, the middle portion of the nerve rested, in some instances on a cork, in others on a glass support. The whole was covered by a glass shade, containing sheets of blotting-paper moistened with water or the normal salt solution, care being taken that the wet paper touched neither the nerve, muscle, nor wires. The zinc strips of the electrodes were connected by means of insulated copper wires, through Pohl's commutator or double key, with the secondary coil of Siemen's modification of Dubois-Reymond's induction coil, the modification consisting simply in enlarging the primary coil to 115 mm. in length, 30 mm. in diameter; the secondary coil to 115 mm. in length, 60 mm. in diameter; while the secondary, moving on brass tracks, could only be moved to the distance of 230 mm. from the primary (the brass tracks were connected with the electrodes). In order still further to weaken the induced current, the core of the primary coil, 145 mm. long, 10 mm. in diameter, could be withdrawn either partially or entirely. The primary coil was connected—a Dubois-Reymond key intervening—with one Grove cell, 81 mm. high and 58 mm. in diameter. Pohl's commutator was arranged so that the current could be sent, without changing its direction, either through the peripheral or the central portion of the nerve. Pressure was made by a column of mercury in very much the same manner as employed by Dr. Mitchell. A graduated straight glass tube, 60 cm. in length and 5 mm. in diameter, had attached at one end a small rubber balloon, the lateral expansion of which was prevented by a tube of cardboard of a little larger diameter than the glass tube, and projecting about 5 mm. beyond it; this card-board was notched to permit of the passage of the nerve, and likewise fitted with an india-rubber cover. Around the middle of the cardboard tube was fastened one end of a copper wire of the same length as the glass tube, and running in a direction parallel to it. Both tube and wire passed through a hole in the top of the glass shade, partially closed by india-rubber. When it was desired to make pressure on the nerve, a little mercury was poured into the glass tube, which was then carefully lowered, so as to compress the central portion of the nerve between the column of mercury and the glass support, care being taken that the nerve lay in the notches in the cardboard, thus protecting it from pressure by the tube itself. The tendency of the tube to rise, which was always present whenever it contained a considerable quantity of mercury, was overcome by clamping firmly the copper wire. I have made sixty-three experiments in all, of which I present the following as examples:

Exp. I.—Rana temporaria; interrupted current:

Time.	S.	M.	Remarks.
8.40	230–83*	230–70	
8.45	230–83	230–70	
		Pressure, 23 cm.	Twitching.
8.50	220	230–73	

* Secondary coil moved to utmost distance from primary, with core withdrawn 83 mm. When a stronger current was desired, the core was first replaced, and then the secondary and primary coils approximated. Observations were made every five minutes; only *the extreme* changes are here tabulated.

Time.	S.	M.	Remarks.
8.55	220	230–75	
			Pressure removed.
9.05	230	230–70	
			Pressure, 42 cm.
9.25	195	230–75	
			Pressure removed.
9.30	225	230–65	

S.—Spinal end of nerve.
M.—Muscular end of nerve.

Exp. II.—Rana temporaria; interrupted current:

Time.	S.	M.	Remarks.
6.00	230–85	230–75	
6.05	230–85	230–75	
			Pressure, 10½ cm.
6.15	230–80	230–80	
6.20	230–80	230–75	
			Pressure raised to 17 cm.
6.30	230–85	230–90	
6.45	230–75	230–85	
6.55			Pressure raised to 45 cm.
7.00	200	230–75	
7.05	140	230–75	
7.10			Pressure removed.
7.15	180	230–65	

Exp. III.—Rana temporaria; interrupted current:

Time.	S.	M.	Remarks.
12.45	230–130	230–115	
12.50	230–130	230–115	
12.55			11½ cm. pressure.
1.00	230–95	230–118	
1.10	230–85	230–125	
			Pressure removed.
1.15	230–90	230–110	
1.40	230–98	230–115	
			10 cm. pressure. Spontaneous movements.
1.45	230–115	230–115	
1.50	230–100	230–135	
1.55	180	230–140	
2.05	180	230–120	
			Raised to 34½ cm. pressure.
2.10	210	230–115	
2.30	210	230–105	
			Raised to 45 cm. pressure.
2.35	205	230–105	
4.45	145	230–95	

Exp. IV.—Rana temporaria; interrupted current:

Time.	S.	M.	Remarks.
1.30	230–115	230–100	
1.35	230–115	230–100	
			Pressure, 37½ cm.
1.40	230–105	230–110	
1.50	230–100	230–105	
1.55	230–100	230–100	
			Pressure raised to 45 cm.
2.00	230–95	230–100	
2.10	200	230–98	
2.25	185	230–95	
			Pressure removed.
2.30	200	230–98	

Exp. V.—Rana esculenta; interrupted current:

Time.	S.	M.	Remarks.
1.00	230–55	230–50	
1.05	230–55	230–50	
			3½ cm. pressure.
1.10	230–50	230–55	
1.15	230–48	230–50	
			Pressure removed.
1.20	230–50	230–50	

In all the above experiments, whose results are confirmed by seven others, it is seen that a constant effect of pressure of a column of mercury varying from 35 mm. to 450 mm. in height is an increase of irritability of the muscular or peripheral end of the nerve, while the irritability of the spinal or central end as constantly decreases. It is also seen that although these modifications of irritability bear a certain relation to the degree and duration of pressure, the variation is much less marked in the peripheral than in the central end of the nerve. Thus, it is seen in Exp. V. that pressure of 35 mm. causes a slight momentary increase of irritability of the peripheral end, disappearing even during the maintenance of pressure, while in Exp. III. it is seen that pressure of 115 mm. caused a decided increase of irritability of the peripheral end, lasting during the continuance of pressure, and on its removal falling below and then rising to the normal irritability; while later in the same experiment it is seen that heavy pressure causes a decrease in irritability of the peripheral end. Exps. I. and II. again show that when the nerve has been in a state of exalted excitability from long-continued pressure, when the pressure is removed the irritability falls below normal without subsequently regaining the normal state. As regards the effect of pressure on the irritability of the spinal end, it is seen that in all instances the constant and invariable effect is a diminution of irritability, that diminution depending directly upon the degree and duration of pressure, while after removal of pressure, if it has not been too severe or prolonged, there is a constant tendency to regain the normal standard, though never reaching it. In some instances when the irritability of the central end is already depressed by pressure, an increase of the pressure causes a slight momentary rise, followed by a more marked fall. I have never found a return of irritability after removal of pressure in the central end after the nerve had refused

to respond to the strongest currents during the time it was subjected to pressure. These experiments also serve to confirm Pflüger's observations, that the nerves when normal are more irritable at a distance from the muscles, or, rather, as explained by Rutherford, are more irritable near their spinal centres even though these centres are destroyed; while, conversely, the fact that this was noted to be the case in the above experiments goes to prove that the nerves in these instances were in a reliable condition for experimenting on.

Having then seen that the effect of pressure on the trunk of a centrifugal nerve is to increase the irritability of the peripheral end and diminish that of the central end during maintenance of pressure, and that these conditions are, generally speaking, reversed upon its removal, it remains to be seen what are the effects of pressure on the centripetal nerves, and then to try to find the explanation of the facts observed.

The method employed in studying the effects on the centripetal nerves was to compare the degree of reflex action evoked by irritations, equal, as far as possible, in every respect, of different portions of the sciatic nerve of a frog before, during, and after pressure, and also, when an equal degree of irritation failed to call forth a reflex action, to compare the degrees of irritation necessary in the different circumstances. In order to bring the spinal cord into the most favorable condition for developing reflex action, it was divided, in most instances, below the medulla, so as to remove the inhibitive influence of Setschenow's centre; in other instances the animals were narcotized with chloral or opium, without, however, changing the general result. In these experiments, in which I followed pretty closely the method employed by Dr. Rutherford in his experiments on the relative excitability of different portions of the trunk of spinal nerves, the sciatic nerve of one leg was carefully dissected out from the knee up to the spinal column, the femoral blood-vessels ligated, and the muscles and bone of the thigh divided and removed, so leaving the nerve the sole connection between the leg and the body. The femur was then clamped to an upright in Pflüger's moist chamber, and the body of the frog hung up at a little distance by a hook thrust through the point of the nose; the nerve was placed as before in a horizontal position on two pair of electrodes, with arrangements for making pressure on the central portion of nerve, care being taken that the nerve was in no degree injured or stretched in the various manipulations. Other arrangements as detailed before.

A represents the muscular end of the nerve, B the spinal end; pressure made on the central portion. Irritation by means of an interrupted current through Dubois-Reymond's coil.

Exp. VI.—Male rana temporaria; medulla removed:

	Reflex Action.		Direct Action.		
Time.	B.	A.	B.	A.	
12.28	230–60	230–55	230–90	230–70	
12.33	230–60	230–55	230–90	230–65	
12.37					36 cm. pressure.
12.40	230–60	100	230–65	230–90	
12.43	230–55	100	150	230–80	
12.45					Pressure removed.
12.48	230–70	170	195	230–80	
12.53	230–70	170	200	230–70	

Exp. VII.—Rana esculenta; medulla removed:

	Reflex Action.		Direct Action.		
Time.	B.	A.	B.	A.	
1.45	230–65	230–45	230–83	230–70	
1.50	230–65	230–48	230–85	230–70	
1.53					320 mm. pressure.
2.00	230–70	230–30	230–80	230–75	
2.01					505 mm. pressure.
2.03	230–60	230–35	230–80	230–88	
2.12	230–55	0	125	230–100	

These experiments, which are uniform in their general results with thirteen others, confirm the conclusions already drawn as to the action of pressure on the motor nerves. As regards the action on the centripetal nerves, I have not been able to obtain quite the same degree of uniformity of action; the above experiments, however, may be taken as fairly representing the usual result. In them it is seen that the reflex irritability of the peripheral portion of a nerve whose trunk is subjected to pressure is diminished during the maintenance of pressure, and tends to regain the normal upon its removal, while the irritability of the central end in some instances, when subjected to comparatively light pressure, at first is increased and then diminished, with a tendency to rise upon removal of pressure if its irritability has been reduced below the normal, while in other cases of more severe pressure the preliminary rise is wanting, as may also be the rise subsequent to removal of pressure if it has been too long continued.

As regards the explanation of these results, I do not feel warranted in drawing any positive conclusion from the sixty-three experiments which I have made with that

end in view. The unreliable character of spring frogs for such delicate experimentation, and the want of proper apparatus for following out what seems to me the most probable explanation, must render that explanation at present merely hypothetical. It is well known that the phenomena of electrotonus are due to the influence which a constant current exerts on the inherent currents of the nerve, and that the degree and character of the influence are largely dependent upon the direction and strength of the electrotonizing current; when the natural and polarizing currents have the same direction, the natural current is increased; when contrary directions, the natural current is diminished: in other words, in one instance the polarizing current is added to the nerve-current, in the other it is subtracted. In the first of these conditions, that of kataelectrotonus, the irritability of the nerve is increased; in the other, anaelectrotonus, it is diminished. If now we have a portion of nerve in a condition of kataelectrotonus, it will only require a comparatively weak stimulus to evoke a muscular contraction if that stimulus moves in the same direction as the natural and polarizing current, while it will require a much stronger stimulus if the exciting current moves in a contrary direction, the increase of strength necessary bearing a certain ratio to the polarizing current.

Such being the case, in studying the effects of pressure upon the irritability of nerves as tested by single induction shocks and the making and breaking of a constant current, I noticed that the increase of irritability of the peripheral end was only well marked when the exciting current flowed in the same direction as the natural current, while to an inverse current there was often a diminution of irritability. The following experiment shows this:

Exp. VIII.—Rana temporaria; nerve-muscle preparation in Pflüger's moist chamber; irritation through one Grove cell and Dubois-Reymond rheochord; D stands for descending current, A for ascending; closing shocks only considered; all plugs of rheochord in position; muscular end of nerve.

D.	A.	Time.
8.*	9.8	4.24
8.	9.8	4.26
	33 cm. pressure.	
6.5	11.	4.30
	Pressure removed.	
8.5	10.1	4.36

* Millimetre scale on which the mercury cups move, the smaller the number the less current is thrown into the nerve.

The explanation of these facts which seems to me the most probable is that the mechanical disturbance of the nerve elements, which Dr. Mitchell has shown to occur in the trunk of a nerve when subjected to pressure, causes a temporary increase of the natural nerve-currents. Then, since we know that the direction of the natural current in a nerve is from the longitudinal surface to the transverse section, in this instance a descending current in the portion of nerve under consideration, if we accept the theory that this current is increased by pressure, we can explain the fact that the nerve is more irritable to a descending current while it is less so to an ascending current, and that these conditions are reversed on removal of pressure. It is true that a nerve is always more irritable to a descending current than to an ascending current upon making the current in the weakest phase of Nobili (the strength of current here employed), but in this instance, after determining the minimum stimulus necessary of current flowing in each direction, we find that pressure, instead of increasing the irritability to all stimuli, as it should do if there were no change in the current, here causes an increase to a current flowing in one direction, while the irritability is reduced even below normal to a current flowing in the opposite direction. This seems to show that the ascending current has to overcome a stronger resistance after pressure than before. I have obtained similar results with single induction shocks. As another method of confirmation of this view, I threw the muscle of a nerve-muscle preparation into tetanus by irritating the peripheral portion of the nerve with a weak interrupted current; when now I made compression of the central portion of the nerve there was a decided rise in the curve of tetanus, falling again when the pressure was removed. When, on the other hand, I applied the tetanizing current to the central portion of the nerve, there was a corresponding fall in the muscle curve, so apparently showing that the nerve in the first instance was in a state of kata-electrotonus, while it was anaelectrotonic in the second. While it seems that with this view we can explain the temporary rise in irritability in the peripheral end as

due to a kataelectrotonic condition of the nerve, it may also account for a portion of the diminution in irritability of the central end, for we know that a nerve when anaelectrotonic offers more resistance to the conduction of impressions than when in the normal condition. Then, since we know that a nerve is less capable of stimulation upon disappearance of kataelectrotonus, while it is more so upon disappearance of anaelectrotonus, we can also explain the diminution of irritability in the peripheral end and the increase of irritability in the central end upon removal of pressure. This theory may also tend to solve the difficulty occurring to Dr. Mitchell (op. cit., p. 113), where, in alluding to the disappearance of conduction during pressure and its return upon removal, in connection with the mechanical disorganization of the nerve which he discovered upon microscopic examination, he says, "Does it seem possible that the axis cylinders should be so broken as to refuse their office, and yet so reunite in a few seconds as to be fit again for functional duty?" I have never been able to find a return to the normal power of conduction after it has been lowered by pressure; and while certainly the main reduction is due to the mechanical disturbance, as explained by Dr. Mitchell, may not the power which is regained be due, in part at least, to the removal of the increased resistance caused by the anaelectrotonic condition of this portion of the nerve?

On the other hand, the pressure may act as a partial irritant to the nerve, not, however, sufficient to cause a muscular contraction, but which requires only the addition of a weaker stimulus to accomplish that result. Again, one cannot help being struck by the resemblance of modifications of nerve-irritability which follow pressure and those which follow section of a nerve-trunk, though I have been unable to find any explanation of the results which follow section.

While then the theory offered seems the most plausible explanation of the facts so far observed, I hope soon to be able to confirm or disprove these views through direct measurement of the nerve currents by means of the galvanometer, as well as to finish a series of experiments commenced to determine the modus operandi of section of nerves.

25 South Sixteenth Street.

BELLADONNA AS A STIMULANT TO THE CIRCULATORY SYSTEM.

BY REINHARD H. WEBER, M.D.

IN No. 275 of the *Philadelphia Medical Times*, Dr. Wilson, in an article on "Opium-Poisoning—Antagonism of Belladonna," gives us his experience of two highly interesting cases of extreme collapse, in both of which life was saved by belladonna, or its active principle, atropia. Dr. Wilson regards opium-poisoning as the cause of the collapse in both cases, notwithstanding that severe vomiting and purging had preceded in his first case. As he appears to base this conclusion on the contraction of the pupils only, he will perhaps pardon me for not coinciding with this view, as I have seen repeatedly great contraction of the pupils in cases of cholera-collapse where no preparation of opium had been given. I recollect vividly the alarm which I felt when I found my first patient with cholera infantum (a babe 13 months old) in the stage of collapse with closely contracted pupils, after I had prescribed six drops of laudanum in an astringent mixture the day before, half a drop only of the laudanum to be taken every two hours. I went to the druggist in order to make sure that no more than this quantity had been added. The druggist's assurance that the mixture had been put up strictly according to my prescription raised a suspicion in my mind that the close contraction of the pupils might have been a consequence of the disease. I concluded not to use any preparation of opium in my next case of cholera infantum. Such a case presented itself soon, and was treated by stimulants and astringents only. The child was lying for over two days in a state of high collapse before death closed the scene, and all the time, except the last few hours, the pupils were closely contracted. Since then I have noticed in most cases of cholera infantum, when collapse was severe enough to produce a decided stupor, this close contraction of the pupils. But for my present purpose, viz., of drawing attention to the high efficacy of belladonna as a stimulant to the circulatory and either directly or indirectly to the respiratory centres, this case of Dr. Wilson proves equally valuable whether we consider it produced by opium-poisoning or by cholera. For what are the facts in this now well recognized antagonism of bella-

donna in opium-poisoning? In a severe case of opium-poisoning we have a state of collapse, caused by a depressing influence of the poison on all the *receptive centres* of the nervous system. The danger to life comes principally from the steadily increasing paralysis of the respiratory centres. Although we have investigations which make it certain that toxic doses of opium depress the excito-motor ganglia of the heart too, still we have good reason to believe that the circulation would not be extinguished by the direct influence of the opium alone were it not for its more powerful ally, the steadily increasing carbonic-acid poisoning of the system, caused by the depression of the respiratory centres. Hence the great stress which our best authors lay on artificial respiration after all other means have failed. If we can keep up the circulation, a good chance is open for recovery, as the kidneys are constantly engaged in removing some of the poison from the blood. Sufficient experience has now forced the conviction upon the profession that this keeping up of the circulation in cases of opium-poisoning can be accomplished best by the subcutaneous administration of atropia. As proof is wanting that we can regard atropia in the light of a chemical antidote, we are forced to conclude that atropia does keep up the circulation and respiration in opium-poisoning by exerting a contrary influence on the circulatory and respiratory centres, namely, a *strongly stimulating one*. Experiment has also shown that belladonna increases the blood-pressure by stimulating the vaso-motor centres. (See Prof. H. C. Wood's Materia Medica, page 236.)

As a consequence of this we have necessarily an increased secretion from the kidneys, and so, by a twofold beneficial influence, the state of danger may be slowly converted into the normal one, and life be saved,—provided that the dose of the poison has not been an extraordinarily large one, and that further absorption of the poison has been stopped by efficient emetics, or by the use of the stomach-pump. But is it not quite rational to conclude from our experience of the favorably stimulant action of belladonna in opium-poisoning that a remedy so effective in overcoming the torpor of the circulatory and respiratory centres, caused by this vegetable poison, intensified by the steady accumulation of carbonic acid, will be of great service to us in all cases where danger to life arises from the flagging of these eminently vital functions? I cannot help thinking that the phrase in which we have formulated our experience, viz., "the antagonism of belladonna and opium," has retarded the general perception of this highly important fact. For my part, I cannot resist the conviction that the best means at present at our command to rouse a patient from a severe cholera-collapse, *epidemic or sporadic*, will be the subcutaneous injection of medium doses of atropia with the purpose of stimulating the circulatory system, so that the kidneys and lungs shall be enabled to excrete the poisonous products of tissue-metamorphosis, conjoined with the frequent introduction of small quantities of water into the stomach, in order to relieve the *inspissated* condition of the blood. If vomiting and purging should be persistent, the addition of small doses of morphia to the atropia would appear to me a useful combination. In a former paper I have given my experience with belladonna in severe cases of collapse occurring during attacks of scarlet fever, typhoid fever, and gastro-enteritis, and the good success of this treatment. I wish now to propose the same remedy as *part* of the treatment *in all cases of collapse or shock* in which danger threatens from failure of the circulation, no matter what name we have given to the malady during which this happens. I would call attention to the fact that our latest authors state that danger in croupous pneumonia results from insufficiency of the heart (see Ziemssen's Cyclopædia of the Practice of Medicine, vol. v. p. 153). And the same author, speaking of threatened collapse in pneumonia, says, "If we can succeed in stimulating the heart to increased labor until the obstacle in the pulmonary circulation is overcome, the problem will be solved." But, in order to show what good effects we can hope for from belladonna in cases where the circulation is failing, I will now relate my experience with it in a case of serious valvular disease of the heart. On May 2, Mr. A. was brought to my office, with the following history:

Mr. A., aged 34 years, weaver, had an attack of acute articular rheumatism about eleven years before, which confined him to bed for eight weeks. Ever since he has noticed at times difficulty in breathing and a painful oppression in the left side of the

thorax. These symptoms grew worse by degrees, and he became unable to work and was obliged to seek medical treatment three months before he was presented to me. He now shows puffed eyelids, œdema of the hands with unnatural coldness, and a cyanosed condition of the skin. His lower extremities are very œdematous; but his principal complaint is the great dyspnœa, which allows him to answer interruptedly only to all questions put to him. The dyspnœa also deprives him of his rest at night, as he is obliged to sit in his bed propped up with a chair and pillows. He has taken but very little food for the last week, as his stomach will not retain it. His urine is very scanty, but free of albumen. On auscultation, at the apex of the heart a total absence of the diastolic heart-sound and a loud double murmur are noticed. Over the pulmonary artery, besides a distinct systolic, only a very weak diastolic sound can be heard, but over the aorta no trace of the second sound, only a prolonged first sound accompanied by a loud grating murmur is audible. The impulse of the heart is hardly perceptible, and percussion elicits dulness over the greater part of the left side of the chest, indicating a considerable effusion into the pericardium. At the posterior wall of the thorax there is dulness on both sides extending one inch above the inferior angles of both scapulæ. Absence of vesicular breathing and of pectoral fremitus shows, as the cause of this dulness, hydrothorax on both sides. He has cough, which produces a mucous expectoration very often streaked with blood. The auscultatory signs rendered the diagnosis of stenosis and insufficiency of the aortic valves certain. As the patient had been ordered milk punch by his former attendant, I told him to continue with it, and prescribed the following mixture:

Extr. belladonnæ, gr. ij;
Potass. acetat., ℥iij;
Syrup. tolutan., f℥i;
Aquæ destill., f℥iiss.—M.

S.—A dessertspoonful to be taken every four hours day and night.

Three days later the patient presented himself again; his mixture had been all taken, and there was already considerable improvement. His pulse was fuller, and but one hundred beats per minute instead of one hundred and twenty-six, as on his first visit. His dyspnœa was so much relieved that he had been able to rest in bed without a chair for the first time last night. His vomiting had ceased and his appetite was reappearing; his bowels were moved regularly twice a day, but his urine was greatly increased, and, as a consequence, his general œdema and the effusions into the serous cavities were lessened. I prescribed the same mixtures in the same doses, only the syrup of squill was substituted for the syrup of tolu. On May 8, the patient came to my office unaccompanied and greatly improved. His dyspnœa is almost gone; his kidneys are acting so well that he is passing large quantities of water, and, as a consequence, the effusions are disappearing rapidly; especially the pericardial effusion has diminished, as the cardiac dulness has been reduced at least two-thirds. He says that never before in his life has he had such an appetite as now, and he consumes large quantities of nutritious food without disturbing his digestive organs. I ordered a repetition of the last mixture. On May 12 a lady patient, neighbor to Mr. A., tells me confidentially that she had seen him working at his loom that morning. Since that time up to now Mr. A.'s improvement continues, and he is now taking no medicine except a ferruginous tonic.

Although belladonna has not been used alone in this case, still I cannot hesitate a moment to ascribe the larger share of the good effect to the belladonna, as he had been treated by a regular physician for dropsy for three months already, and no doubt diuretics had been used freely but without effect. It is also quite apparent that an increased secretion from the kidneys is impossible without an increased supply of *arterial blood* to these organs. This increased supply can have been the result only of the stimulating effect of the belladonna upon the vaso-motor centres and the excito-motor ganglia of the heart.

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CONSERVATIVE SURGERY IN COMPOUND COMMINUTED FRACTURES.

BY ROBERT BURNS, M.D.,

Frankford, Philadelphia.

(Read before the Surgical Section of the American Medical Association, June 6, 1878.)

IT is undoubtedly the case that many severe compound comminuted fractures of the extremities may be saved from amputation, and restored to usefulness, under careful and judicious management, especially so in civil practice, where perfect quietude and suitable appliances can be had. In active military practice it may be a very difficult matter, and many limbs may be lost on the field which would be saved under other circumstances. To save a limb is vastly more important and praiseworthy than the most expert amputation, however handsomely performed. Having had some experience in this kind of surgery, I feel loath to have recourse to

the knife, if there is a reasonable hope of success in conservatism.

The case which is brought forward to illustrate the above principle (of practice) was one of great severity, and very discouraging in its aspects, being a compound comminuted fracture of the humerus, ulna, and radius, in four separate places, with penetration of the soft parts on both the fore- and upper arm, the history and treatment of which I shall present as concisely as possible, hoping that it may not be without some interest and utility, by inducing surgeons to gain reputation by saving rather than removing limbs.

John Marshall, about 39 years of age, born in Yorkshire, England, by occupation a wood-turner, engaged in that branch of his trade denominated bobbin and spool turning, in Frankford, Twenty-third Ward of Philadelphia. On Wednesday morning, March 20, 1878, while on a ladder proceeding to put the belting over the pulley, while the shaft was making five hundred revolutions per minute, being much slower than the working movement, his little finger was accidentally caught by the belt, the arm thrown backwards and revolved with the shaft. With uncommon coolness and presence of mind, he managed to pull out the arm before it was detached from the body or himself killed. Being conveyed to his home, I was sent for, and on examination, immediately after the accident, in the presence of my son, Dr. R. Bruce Burns, found the humerus broken in two separate places, the intermediate piece of bone being about three inches in length, the inner side of the arm, by the border of the biceps, being penetrated by the broken extremity of the bone. The ulna was fractured in a very oblique manner, the radius was broken more transversely and comminuted, and the upper end of the ulna, being sharp, from the obliquity of its fracture, penetrated the integuments to the extent of two and a half inches. Through this opening, after the reduction, several small spiculæ of bone from the radius could be felt by using the finger as a probe. These were allowed to remain, lest too much handling should establish irritation.

My first thought was that the arm could not be saved, but that amputation at the shoulder would be a necessity. The desire of the patient and friends being, of course, to save the arm, and having many times saved fingers as well as arms and legs, under the most discouraging circumstances, I thought that, as the arteries and nerves were entire, and the habits and constitution of the patient were of the very best character, with judicious treatment the trial might be made. Accordingly, we administered ether, in doing which the patient became very refractory and had wellnigh ruined his arm. However, with active measures of restraint, he soon became completely anæsthetized, and the fractures were as completely reduced as possible. The whole limb was then carefully bandaged and placed in well-padded rectangular splints, extending from the axilla and acromion to the ends of the fingers, and the wounds of the integuments left open, being dressed with ceratum simplex. The reduction of the bones being satisfactory, a bandage was carefully applied, to secure the dressing, the limb being placed upon a pillow covered by oil-cloth. Cold-water cloths were ordered to be constantly applied over the whole, and the patient to be kept under the influence of an anodyne. The extensive abrasion of the integuments of the back of the hand was left open, dressed with cerate, and covered by the wet cloths. When the effects of the ether passed off, he expressed himself as comfortable.

The next day, in consequence of swelling from the subcutaneous effusion of blood, the bandages gave pain, requiring them to be cut at several points, and towards the evening of that day required the removal of nearly the whole dressing, lest the pressure and interruption of the circulation should produce gangrene. The limb was carefully secured upon a pillow, and, under watchful care, was so left until I could proceed to Philadelphia and order the manufacture of a wire splint with an angle of about ten degrees. Having communicated my plan to Mr. Gemrig, the well-known surgical-instrument-maker, he had one made immediately, resembling a deep trough, extending from the axilla to beyond the fingers, in depth that of the size of the arm, and wide enough to admit of packing, and lined with canton flannel. On this splint I placed a bed of finely-picked oakum and another layer of very fine carbolized tow, and on this the arm was placed without a particle of bandage, the space between the limb and sides of the splint being carefully filled with the

soft carbolized tow, making as much pressure by this means as would secure a correct and safe position. The arm was now at perfect rest, and impacted sufficiently tight to keep its place; the upper surface was left bare for easy inspection and the application of a lotion, which was constantly applied day and night. This lotion consisted of common vinegar and whisky, of each half a pint, and one drachm of carbolic acid; to this was added half a pint of water. Cloths saturated with this lotion were applied whenever they became warm; the moisture gently flowed over the arm, percolated through the tow, and passed through the meshes of the wire splint to the oil-cloth underneath upon the pillow, on which the whole was placed. In order to prevent any sudden jerking of the arm, three or four short pieces of bandage were passed around both arm and splint, which so effectually secured the limb *in situ* that the patient could move about, the arm being supported in the splint, without danger of disturbance. Suppuration of the wounds progressed favorably, and the back of the hand healed first. On the fifth day (March 25) the arm was taken out of the splint by steady and careful lifting. The wound underneath was now beginning to suppurate. The whole limb was well sponged and the dressings applied, and then placed gently in the splint. For several days there was some febrile action, though much less than might have been expected. The arm was considerably swollen, but such was the easy position of the arm that, under steady perseverance, no serious difficulty occurred. Every three days it was well washed with soap and warm water, and had the bed of tow renewed. On the twenty-fourth day the humerus was united and in good position; the ulna was also tolerably firm, but the radius was not, and the wound was closing and discharging but little. On the 3d of May, six weeks and three days from the day of the accident, the flesh-wounds were all healed; all the bones but the radius were firmly united, and the health and spirits of the patient were perfectly good. Being now anxious to have some movement of the wrist and elbow joints, I had Mr. Gemrig to make another wire splint, with a joint at the elbow, and enclosed both the lower and upper arm in it as accurately as possible, the arm being bandaged from the ends of the fingers to the shoulder, leaving the elbow free for the purpose of movement, and the splint was applied, but failed, in consequence of there being too large a space between the lower and upper portions, which caused the elbow to swell and make the patient uncomfortable. It was therefore removed the next day, and replaced in its former splint, being well bandaged, expecting at a future time, when the bones were stronger, to apply another hinged splint to make gradual movement of the joints. Once a week it has been washed and rebandaged since the above date, May 3, and up to this writing, May 26, he enjoys himself in walking about, and although the apparatus on his arm seems clumsy, yet he has become so accustomed to it that he dreads leaving it off. He states that he feels it stronger every day, and that he is certain all the bones are united. In this opinion I concur, and report the case as an entirely satisfactory example of the good results of conservative surgery under apparently unpromising circumstances.

NOTES OF HOSPITAL PRACTICE.

COLLEGE OF PHYSICIANS AND SURGEONS, NEW YORK.

CLINIC OF PROF. T. GAILLARD THOMAS, FOR DISEASES OF WOMEN.

Reported by P. Brynberg Porter, M.D.

OLD HÆMATOCELE(?).

GENTLEMEN,—The patient whom you see before you comes to us from a distance, but she brings with her a most excellent history of her case from the physician under whose charge she has been for some time. I prefer, however, to get the history for you from her own lips. Her name is Mary S——. She was born in the United States, and is thirty-four years of age. She has been married eleven years, and has never had any children or miscarriages. So much for her social condition. Do we learn anything from this account? Our suspicions are at once aroused that there is something wrong about her pelvic organs. She presents a perfectly healthy appearance, but the fact that she has been married all these years and yet has never been pregnant, shows that she is probably by no means a perfectly healthy woman. Now, however, let us hear what she has to say of her own

case. How long have you been sick, Mrs. S.? "Seven years." Were you in good health at the time of your marriage? "Yes, and for several years afterwards." You have been married eleven years, you say? "Yes, the last time; but I have been married twice, and the first time was sixteen years ago." (This is something which I did not know before, and it already puts me on the scent of something which has not been at all clear about the case.) How was your health at the time of and after your first marriage? "I was well when I was married, and for two months afterwards, and then I had a bad attack of what the doctor called neuralgia of the bowels." (Now I think we shall be able to get at the foundation facts of this woman's case, which I now find I have not before ascertained. A suspicion at once occurs that sixteen years ago something happened which, all through this long period, has rendered the patient incapable of bearing children.) Do you remember anything about this attack that you speak of? "My monthly sickness stopped for some weeks, and my friends said I had taken cold." How long were you sick? "Three months." Were you confined to bed most of the time? "I suffered a great deal from pain, and had to be on the sofa almost always when I was not in bed." (All this comes to me like a revelation. I confess that when the patient came before you there were certain phenomena about the case for which I was quite unable to discern any satisfactory explanation; but in the light of what she has just told us, what was before a mystery is now thoroughly cleared up, and the case becomes, as it seems to me, perfectly plain.) Were you ever so ill at this time that your friends were alarmed for your life? "The doctor sometimes thought that the trouble might go to the heart." Where was the pain situated? "In the back and side, and running down the right limb." Was it so severe that the doctor had to inject morphia under the skin? "I was obliged to use morphia, but I always took it by the mouth." Did you have your monthly sickness at the next period after this attack of illness commenced? "Yes." Now, will you be kind enough to tell us how you have been suffering since that time? "In the morning, when I first get up, I always feel more tired than when I go to bed. My back is so weak that I can hardly do any work, and when I cough it feels as if it would snap my back in two. In the afternoon I feel somewhat better, but by night-time I am all used up again." Have you desired to have children? "No, I never desired particularly to have children: all I wanted was to get well of my trouble." But you have never resorted to anything to prevent conception? "Oh, no." Do you think you have ever been a well woman since you had that attack of which you have told us? "I have felt pretty well at times, but have never been able to work and get about as well as I could before that." Do you suffer much at the time of your monthly sickness? "I used to suffer a great deal up to a year ago; but since then the doctor has been using sponge tents, and they have given me great relief." How have they relieved you? "The blood used to come away in large clots, which gave me great pain; but when the sponge tents are used there are no clots."

Now, gentlemen, you have heard this interesting history; and the first symptom that strikes us in it is the sterility. It is not, however, the symptom for which the patient has come here to be treated; for she tells us that she has never particularly desired to have children. Next, we learn that a number of years ago there was some serious trouble in the pelvis, which was probably posterior to the uterus, and which was called "neuralgia of the bowels." From the effects of this she is undoubtedly still suffering. She gets up in the morning feeling perfectly exhausted, and, after becoming somewhat more comfortable later in the day, returns to bed at night utterly worn out again. She has a great deal of pain and soreness, and, as she graphically expresses it, when she coughs feels as if it would "snap her back in two." Then, she has had this severe dysmenorrhœa which has been so happily relieved by the use of sponge tents; and, judging from the letter from her physician which she brings, I should suppose that she had been under the most intelligent treatment.

When I made a physical examination (the patient lying upon the back), I discovered that the uterus was pressed over to the right side and greatly bent, or, in other words, that it was in a position about midway between complete lateral version

and anteversion. When I endeavored to pass the probe I met with obstruction at the junction of the cervix with the body of the uterus, but, with a little care, succeeded in reaching the fundus with it. When I withdrew the instrument it was followed by quite a free flow of mucus. It is this flexion, then, which has caused the patient so much suffering at her menstrual periods (rendering the temporary straightening of the canal by the use of sponge tents necessary), and which has prevented the passage of spermatazoa into the uterus, and thus occasioned her sterility. On resorting to conjoined manipulation, I am able to move the uterus up and down pretty freely; but it still remains bent forward. Now, what bent it forward? Just back of the uterus there is a large mass, such as I show you in the manikin, which can be palpated, and which is found to be very slightly movable. One of my assistants, on feeling it, thought that it was a post-uterine fibroid; but to me it gave the distinct sensation of a sac of some kind. Of whatever nature the tumor is, it is undoubtedly this which has caused the flexure of the uterus, and which has given rise to all the symptoms from which the patient has been suffering for the last sixteen years. I may, perhaps, be wrong about its being a sac containing fluid; but I am of the opinion that I detected a sense of fluctuation when employing conjoined manipulation. Is there any way of making a positive diagnosis here? Yes; by plunging a small aspirator-needle into it. If the tumor were a fibroid, there would be no harm done, and if it were a sac containing fluid some of the latter would be withdrawn. If fluid were withdrawn from it, would the diagnosis be made? Yes, as far as this,—that there is a sac posterior to the uterus, which has caused a flexion of the organ, and given rise to the pelvic neuralgia and all the other trouble from which the patient has been suffering for sixteen years.

Supposing that it is a sac, what kind of a one might it be? First, it might be a uterine fibro-cystic tumor, bearing the exact relation to the uterus that this red mass does in the manikin. If such were its character, and we passed the aspirator-needle, we should evacuate its contents; and sometimes these cysts are just as pure a collection of water as ovarian ones. Some years ago a patient like this, but with a much larger sac in the pelvis, came to the clinic from New Jersey. While on her way here she was seized with such agonizing pain that it was necessary to send her to the Strangers' Hospital, at which I was then one of the attending surgeons. Aspiration was resorted to, and it was then found that a vessel had ruptured inside of the sac, and that her suffering had been due to the great amount of blood which had been poured into it, and which, in connection with the fluid already present, had distended its walls to the utmost extent. A short time afterwards I removed a large sac by operation,—tying or clamping it (I forget which now) at the seat of its uterine attachments. The ovaries were found to be entirely normal. A rather curious accident, I remember, occurred in this case while the patient was recovering. Eight or nine days after the operation, the house-surgeon noticed a clear straw-colored fluid escaping from the drainage-tube, which had been left in position, and which evidently came from the peritoneal cavity. I was a good deal puzzled to know what to make of it, until I made some inquiries in reference to the patient's urine, and ascertained that she had not passed any for twenty-four hours. The bladder was entirely empty, and the fluid when examined was found to be urine. There had evidently been a slough somewhere, and it had thus leaked into the peritoneal cavity, from which it escaped through the drainage-tube, as has been mentioned. After that the foot of the bed was elevated, the bladder was kept empty by means of a catheter permanently secured, and the patient made a good recovery. That was a pure uterine cyst; but I do not think this is the case here, and I am of the opinion that the cyst had its origin sixteen years ago.

Next, it might be an ovarian cyst which by its weight has fallen down into Douglas' cul-de-sac; but this is highly improbable, because such growths are progressive, and in three years it would undoubtedly have called for operation, if it had been of this character.

What, then, is it? My impression is that it is a blood-cyst, and that it was formed in the following way. Sixteen years ago, when the patient had the attack of so-called "neuralgia of the bowels," there was probably a rupture of some vessel, and this pelvic hæmatocele has been the

result. I think it altogether likely that if an examination had been made at that time an enormous collection of blood would have been found just back of the uterus. Ordinarily the blood becomes absorbed in a longer or shorter period; but in certain rare cases a sac containing semi-solid blood remains for years. Perhaps you may ask me if I know of such cases by actual experience. In reply I would say that I have met with one such case, and it was a very striking one. You will understand, however, that I do not make a positive diagnosis, but only give you what seems to me, after a careful consideration of the case, to be the *probable* diagnosis. I shall therefore ask you to regard the case as still *sub judice*, until I shall have had an opportunity of resorting to the aspirator. But let us suppose that I am right (and I do not know how else to account for the history and all the phenomena observed), that there has been a hæmatocele which has lasted for sixteen years, has been the cause of the uterine flexion, and has given rise to all the other symptoms: what treatment is to be pursued?

There are only two plans that can be adopted. The first is to aspirate, and, the contents of the blood-cyst being thus evacuated, allow the uterus to go back to its normal position. Sponge tents, which are now only palliative, on account of the mass behind the uterus preventing it from remaining straight, would then probably become curative, because all source of obstruction would then be removed. But there are two objections against this method of treatment. First, the blood might re-accumulate; and, second, septicæmia might occur through the admission of air into the sac. In such cases as this septicæmia is exceedingly apt to occur; and it would be a serious question whether the amount of suffering undergone by this patient would be sufficient to justify us in running the risk of it.

The other plan is to allow the patient to remain in her present condition, and employ only such palliative measures as may seem of service. I shall not, at all events, decide to-day which plan it would be best to adopt; but after I have written to the patient's physician, and considered the case more fully in all its bearings, I will give you the result of our deliberations.

Now let us suppose that this woman had been married only three months, that her menses had disappeared, and that she thought herself pregnant. Suppose that the mammary and other signs of utero-gestation were present, and yet that the uterus was not enlarged. The diagnosis would undoubtedly be that of extra-uterine pregnancy. But if it were a case of abdominal pregnancy I would not think of operating until labor commenced, as it invariably does in these cases, at the end of nine months, when I would perform laparotomy, precisely as in the case of the colored woman a short time ago at the Woman's Hospital, with the expectation of saving both the life of the child and the mother. But here we may exclude pregnancy if it is ever to be excluded. Yet I know of the case of a woman of sixty-five who had a movable abdominal tumor about which there were various conjectures, such as detached fibroid, floating kidney, etc., but which proved at her death to be a fœtus, which had been in the cavity of the abdomen for many years.

(To be continued.)

TRANSLATIONS.

Development of White Swelling.—Kortweg (*Cbl. f. Chirurgie*, 1878, No. 17) says that the first symptoms of "tumor albus" are of a functional nature,—limping and slight pain. A little later, inspection shows a puffy swelling about the joint, which appears both clinically and anatomically to be a diffuse connective-tissue formation in the soft parts about the joint. Rest and compression applied at this stage usually bring relief, and at this time certain circumscribed painful spots may be made out which were before obscured by the general enlargement. Should the joint again be used, the appearances and symptoms above mentioned return. Should a cure not have been effected, examination of the parts at this stage shows—1st, fungous growths from the synovial and perisynovial tissues; 2d, a small quantity of slightly turbid synovial fluid; 3d, the cartilage slightly cloudy and loosened; 4th, frequently bone disease, either in the form of diffuse red softening or collections of caseous necrosis, occasionally also cavities filled with fungosities. When the joint is opened at a later stage, the disease is usually so generalized that its

original seat cannot be demonstrated. This course of the disease Kortweg has followed out in more than a hundred cases which have come under his care, and the conclusion to which his researches have brought him is that "tumor albus" is always primarily an affection of the bones. His reasons are as follows. This theory explains the symptoms rationally. In similar bone troubles of other parts of the skeleton the same sequence of symptoms is noted. That disease of the bones is not always found is not surprising: the central focus of trouble may lie above the line of the saw in operating, so as not to appear in the resection. In one such case, occurring in the elbow-joint, another resection was required, when, just above the level of the first, a centre of disease was found in the bone. Very often the focus of bone trouble is found for the first time in sawing the resected portion for examination, it not having been detected before. If we accept the theory of primary bone affection, we escape the following difficulties, which are unavoidable in connection with the theory of a primary synovial disease 1. Two clinically identical affections must be regarded as anatomically distinct. 2. The irritation experienced by the synovialis must be propagated so rapidly to the external tissues that they become involved almost as soon as the former, and appear indeed the chief seat of the disease. 3. The irritation in the granular synovitis must act on a synovial membrane strongly inclined to chronic hyperplastic process with an intensity at once too decided to cause hydrops and not decided enough to cause suppuration. 4. We must believe that in an undoubted primary inflammation of the joint, synovitis and chondritis may be so slight that, though the patient is lame, with sensitiveness of the tibia for years, not only no suppuration but even no granulation can be found in the synovialis. 5. Finally, we must explain the fact that the spontaneous cure of "tumor albus" almost always occurs without anchylosis, motion being usually nearly normal. x.

Treatment of Persistent Vomiting during Pregnancy by Ether Spray.—M. Dujardin-Beaumetz (*Bull. Gén. de Thérap.*, No. 7, 1878) gives an account of a young woman in the second month of pregnancy who was seized with such obstinate vomiting that she could not retain either solid or liquid food. After having tried all the remedies usually employed,—valerianate of caffeine, chloral, plasters of opium, tincture of iodine, etc.,—M. Beaumetz employed the following simple method suggested by Dr. Lubelski,—that is to say, atomization of ether externally against the region of the stomach. The process was as follows. Immediately before a meal, Dr. B. used a Richardson's spray producer, directing the jet towards the middle of the dorsal region, and towards the region of the stomach in front. The vomiting ceased at once, and after eight days' treatment the patient was perfectly well. (Lubelski's paper was read before the Académie de Médecine de Belgique, Séance of Feb. 13, 1878,—*Transactions*, v. xii. p. 76.) x.

Resection of the Ribs in Retrocostal Abscess.—Some time ago Roser called attention to this operation, but the idea did not find favor generally, and Fränzel, in Ziemssen's Cyclopædia, condemns it. Recently, however, Lossen of Heidelberg has taken the matter up (*Berlin. Klin. Wochens.*, 1878, No. 9), and recommends the operation. Lossen alludes to the usual result of opening the pleura by puncture, the formation of fistula and tedious or imperfect closure of the abscess. This is to be attributed to the stiff and immovable character of the walls of the cavity. Were a method found by which the abscess-walls could be approximated, it could then contract upon itself and heal up. Lossen adds notes of the case of a young girl who had suffered with abscess and fistula in the right side for many years, in whom resection of two-thirds of an inch of the sixth and seventh ribs was practised, and revealed a cavity the size of one's fist, which healed up to a great extent and without untoward symptoms. A second resection resulted in cure of an abscess which had existed seventeen years, and which under other circumstances would probably have lasted the patient's lifetime. x.

Caudal Appendage in the Human Being.—Greve (*Chl. f. Chirurgie;* from *Virchow's Archiv*, Bd. lxxii. p. 129) gives pictures and an account of a new-born child who presented an abnormal extension of the coccyx forming a veritable tail about the size of one's little finger. When this was irritated with the point of a needle, some movement was produced. It was removed by operation at the end of two months. x.

PHILADELPHIA
MEDICAL TIMES.

PHILADELPHIA, JULY 6, 1878.

EDITORIAL.

THE MICROPHONE IN MEDICINE.

IN this age of invention and of marvellous discovery the future possibilities of our profession seem immeasurably widening, especially as regards the early and definite recognition of pathological conditions. The application of the principles of acoustics to diagnosis, the addition of the stethoscope to our means of examination, the almost mathematical accuracy with which the majority of cardiac and pulmonary lesions may in this way be determined, are still subjects of pride and of congratulation with us, when the whole field of physical exploration is suddenly broadened by the discovery of Professor Hughes, that acoustic waves may be almost indefinitely magnified by transformation under certain conditions into electric waves, and that in this way millions of sounds to which we have always been absolutely deaf may be rendered clearly audible. Eager experimenters are already at work, and although practical difficulties still exist, it does not seem visionary to suppose that in a short time many new sounds, normal and abnormal, will become familiar to us, and that, as a consequence, many deviations from health, heretofore only recognized by their resulting organic changes, may be detected, and possibly arrested, at a far earlier period. We find on the one hand Dr. Richardson, of London, examining and noting the heart- and lung-sounds with the aid of the microphone, and, on the other, Sir Henry Thompson lecturing on the use of the microphone in searching for stone and in probing for bullets or for diseased bone. When we remember that by means of this instrument the crawling of a fly over a piece of gauze may be rendered as audible as the tramp of an army, or its breathing as distinct as the bellowing of a leviathian, we can already look forward to treatises on the sounds of inflammation and the rhythm of fevers; the harmonies of health and the discords of disease will no longer be fanciful similes, but scientific facts, and the poet's assertion that "there is in souls a sympathy with sounds" will be philosophically verified.

A NEW TREATMENT OF AN OLD TROUBLE.

WE are in receipt of an apparatus called a spermatic truss, sent us by the Cooper Truss Company, of Pittsburg, and consisting essentially of a belt to be buckled around the body, and a pouch for drawing the penis downwards and backwards and retaining it in that position. The theory of the employment of this apparatus, as stated in the accompanying circular, is that by its use erection is prevented; that until erection is complete, sexual desire is very feeble, and that consequently if erection be interfered with sexual desire is also almost entirely prevented. Taking the premises as correct, the subsequent statements in regard to the benefits to be derived from the truss might be thought to be worthy of consideration; but no one who has had much experience with this class of cases would admit these propositions as absolutely true, or even as true in the majority of cases. True spermatorrhœa, as distinguished from the infinitely more frequent condition of sexual hypochondriasis, is a disease attended with loss of tone and with ataxia, and is only rarely characterized by ejaculation or by pleasurable orgasm. Sexual desire, instead of being excessive, is often wanting, and persistent or frequent erections, either as a cause or consequence of that desire, are excessively rare. Nocturnal emissions then, at least of the kind here described, are not in the least

indicative of the existence of this disease, and any report of cases in which the diagnosis was founded on this symptom must be viewed with distrust. We doubt also, from observation of the workings of similar expedients, the probability of any mechanical apparatus encircling and confining the penis exerting a beneficial effect in preventing erection, and have been rather inclined to attribute to them the contrary influence. This, however, is a point to be determined by a practical trial of the instrument, and, as we have not yet had an opportunity of applying it, we simply call attention to its construction, and to the claims which are advanced for it.

A New Use of the Dental Engine.—At the recent meeting of the American Medical Association at Buffalo, Dr. Albert H. Smith reported some successful experiments he had lately made with the burr, rotated by the flexible shaft of Bonwill's dental engine, in the denuding of tissues in the restorative operation of the female pelvis. He claims for it great economy of tissue, in the removal of a slight film, entire control of action in the cutting away of larger masses when necessary, the production of a surface as fresh as if cut with a knife, yet bleeding less, because more superficial than can be made with a knife; also of a surface smooth and uniform in character, giving special facility for close apposition and accurate adjustment, particularly in such operations as Emmett's for lacerated cervix. Either the steel burr or a wheel of coarse corundum stone will answer for denuding.

CORRESPONDENCE.

LONDON LETTER.

IT is commonly said of Englishmen that their talk runs largely on their weather. Probably such statement is no libel, and if they do make the weather a stock subject for conversation, they are probably justified by the eccentricities of their climate. A writer of fiction once said to me, in reference to the variable summer weather in the hills of the north of England, "I am thinking of commencing a novel, the scene of which will lie in the northern hills, 'It was a bitter August morning;'" and, indeed, it may be said of us at present that we are having bleak weather. The consequence is that, instead of summer diarrhœa at the hospitals, we have still winter coughs, old folks with chronic bronchitis and emphysema waiting, with long-drawn-out suffering, for that warm, genial weather which alone can warm them, check the rheum from their bronchial lining membrane, and endow them once more with an approach to the sensations of health and strength. How long the fulfilment of their aspirations will be delayed it seems impossible to say. Not only is such weather bad for the inhabitants, but it makes one bow one's head with shame when an American, newly arrived on our shores for the first time, asks, "Is this your June weather here?" What is left but to explain that usually we have some sun in June, and to apologize abjectly for the inhospitable attitude of our climate?

One evening lately the British Medical Temperance Association held a conversazione at the house of Dr. Edmunds, well known for his energetic activity on behalf of the temperance cause. At this gathering there was read some account of the working of the Temperance Hospital during the four years it has been in operation. From the report read it is certain that the mortality in that hospital is not above the average; indeed, the results attained must be gratifying to the supporters of the institution. As to whether such an experiment can do much towards definitely settling the subject of how far alcoholic stimulants are absolutely essential, or not, to the treatment of disease, and how far the abuse of them may be set against their utility, probably opinions may differ. But the experience of this hospital proves conclusively that many of the major surgical operations may be safely performed, and the after-treatment conducted satisfactorily, without any alcoholic stimulants being administered. On the other hand, this plan of averaging out results is eminently unsatisfactory, as it leaves a margin of doubt as to how far in some particular instances alcohol might have been given with good effects: it makes the general result cover over some items of the greatest interest. Not, be it understood, that alcohol is prohibited absolutely, but it is put down, like other medicines, in a register, and given only medicinally, and not in the promiscuous manner in which it is distributed ordinarily. Of course the patients who present themselves at the Temperance Hospital are, doubtless, as a rule, teetotallers, and, therefore, comparatively good material to work upon, and the hospital has the advantage of being free from those broken-down drunkards who fill a large

proportion of the beds in other hospitals. Thus it will be seen that the problem to be solved is a very complex one, and a number of years must elapse before anything like trustworthy conclusions can be arrived at from this experiment. From the report it would appear that in grave operations "healing by the first intention" is frequently obtained. The tinctures are all prepared without alcohol and by means of glycerine, which is stated to be an excellent solvent and means of extracting the different vegetable principles. The only things which resist it are some gums, like guaiacum, which can be emulsionized; so that no practical difficulties are encountered in the preparation of their medicines.

The meeting was enlivened by the presence of some well-known men, who had something to say about abstinence from alcohol under various circumstances. Thus, Mr. Spencer Wells stated that in his operations no alcohol was given unless it was distinctly indicated, and that most of his cases never tasted alcohol either at the time of the operation or during the after-treatment. Then Dr. Rae, the famous Arctic voyager, gave some account of his experiences in frozen regions. He was distinctly against its use in cold climates, and in so far was in perfect harmony with most other authorities. Alcohol is not adapted for great cold, and the Highland gillie who declined a proffered glass of whisky on the plea that it was too cold was doubtless speaking from an instructive experience. Then Froome Talfourd related his experience on the Indian frontier far north, and said that whenever an Indian was found frozen to death in the settlements it was the invariable case that he had taken freely of spirits. Then Admiral Hamilton told how long and strenuously he labored at the Admiralty to do away with the enforcement of the daily ration of rum which used to be issued to our seamen. In fact, a very safe line, not likely to be much controverted, was this, viz., that alcohol does not agree with great heat or great cold. An East Indian surgeon, a teetotaller of many years' standing, testified against arrack and brandy on the plains of Bengal. Altogether the evening was a very pleasant one, and gratifying to those connected with the temperance cause.

This Association consists at present of thirty-five members, none of whom take alcohol in any form. There was a curious fact to be observed about the leaders, and also about the followers, of this movement,—namely, that they were all men of the neurosal diathesis, with well-vaulted skulls and thin, small abdomens. In fact, they are a body of men who can thoroughly task or overtask themselves without resort to alcoholic stimulants. Tea is their favorite beverage, and, as a rule, these men have fine wives. In fact, their peculiarities are not of their own making, but the product of forces which have been in action for generations; their abstinence has been settled for them centuries before the temperance movement was dreamt of. On pointing out this fact to them, at first they winced, but as one after another gathered round, "the type" became so distinctly apparent that they laughed heartily. In fact, they listened quietly to the statement that even the creeds of races have been determined by their physical configuration and their consequent physical inclinations. Thus, our hard-headed, square-abdomened, massive Norse ancestors would go off cheerfully on expeditions where they were away from their women for months, while their paradise was the drinking-hall of Walhalla. On the other hand, the lean, spare, weasel-bellied Arab built up a paradise in which alcohol was unknown, but it was filled with houris. This way of looking at them and their proclivities was received with a good deal of interest, and several admitted the justness of the generalization, while none actively disputed it. In fact, the leading teetotallers, as a body, are just those people for whom alcohol has the least attraction: but in making this statement I do not wish to impugn their earnestness or their philanthropy.

The common yet fatal disease among cattle, known as *pleuro-pneumonia*, has been made the subject of an elaborate research by Dr. Gerald F. Yeo, the accomplished Professor of Physiology at King's College. From this report it appears that the pathological changes can be distinctly traced, though the time has not yet come when the method of infection can be comprehended so as to prevent infection, except by separation and isolation. It appears that the first commencement of the disease is a cone-like mass of inflammation at the surface of the lung. "The chief points are as follows: 1. The bronchial tubes are always diseased in the region affected with the opaque conical form of consolidation and in its immediate vicinity. 2. The mucous membrane is extensively diseased, the epithelium destroyed, and the bronchus filled with a plug. 3. In this region, also, the walls of the bronchus are thickened, and its calibre is diminished. 4. The sheath common to the broncho-vascular system is throughout swollen, rigid, and densely infiltrated. 5. The lymphatics of the entire vascular territory are rendered impervious by dense exudation. 6. In the early stages of the affection the morbid process of the lining of the bronchus is more extensive than that of its wall and surrounding tissue. 7. The walls of the vessels may be implicated, and their lining membrane irritated and damaged. 8. Thrombosis may occur at one or several points of the vessels, and cause the occlusion of some of them. 9. Small emboli may break off from a thrombus, and plug several branches of the artery. 10. The disease seems always to make greater progress in and around the bronchus than

around the corresponding vessels." He does not find that it is the pleura or the subpleural and interlobular tissue which is first affected, but has been obliged to pass to the deeper parts. The pleural inflammation is either localized to the spot affected, or, if the pleurisy has become more extensive, it is much more developed at that point. When the pleurisy is acute in animals, as in men, active constitutional disturbance results; but such is not the case with pleuro-pneumonia. There is in it always evidence of such changes as would require a certain amount of time for their development,—often a longer time than would seem indicated by the clinical history of the animal. Often the animal only manifests symptoms of illness for a few days before death, and changes are found which must have taken some months to develop. It would seem that the local change in the lung goes on for some time implicating the pleura over it, and then, for some reason, the pleura becomes generally inflamed, and then acute symptoms are manifested. He states that he is quite "convinced that the lung disease usually exists for months without being suspected, and invariably the beast is first thought to be sick only when the affection has spread to the pleura and caused intense inflammation of that membrane, with its accompanying well-marked symptoms." If the diagnostic powers of veterinary surgeons were improved, cases of pleuro-pneumonia without pleurisy would be more frequently met with.

In asserting that the pleural lesion is secondary to that of the lung he takes care to avoid implying that the lung-parenchyma cannot, under any circumstances, become secondarily affected from the pleura covering it. It was seen that nothing is more common than this spreading of the disease from the pleura to the adjacent tissue. The infective process may be communicated from the primarily-affected lobe to its neighbors by means of the intervention of the pleura, and in these cases the pleura does seem to be the starting-point for those lobes thus secondarily affected. But if the primarily-affected lobe be carefully examined, it will always be found to contain a wedge of typical marbling extending towards the root of the lung, with the bronchi and vessels diseased in the manner described. In this deep-seated, conical, indurated region the morbid process is more developed than elsewhere, and it is such centre, he believes, that forms invariably the original point of disease. One such focus, at least, can always be found in some one or other part of a diseased lung, however extensive the wide-spread, shallow pleural infection may be. He holds it impossible to explain this chronic, old, indurated part of the lung disease as a result of the acute recent pleurisy. He thinks there is no difficulty in explaining the pleuritis as the result of the lung injury.

Putting aside the existence of any specific form of infective material, the irritation and inflammation of the pleura may be explained by the mere mechanical injuries done to the membrane by the swelling of the subjacent lung during the disease. To this exciting cause may be added defective lymph-drainage and impaired blood-supply. When there is hemorrhagic infarction—which is very common—there is no difficulty; the pleura may be torn, or some blood may escape into its cavity and set up general inflammation, and the part of the membrane corresponding to the infarction is always cut off from its supply of normal nutrition. The commencing-point is the chronic inflammation of the connective-tissue sheath of the broncho-vascular system, which is followed by great thickening of the walls of the vessels. Around the starting-point there is an area of clear exudation by the bronchial lymphatics by means of the pleura. The lymphatics of the part primarily affected are in connection with the pleura over the part, and from the pleural surface the bronchial lymphatics of adjoining lobules are involved. The clear exudation is always more wide-spread and superficial, less solid and less defined, than the opaque induration. The tissue-elements remain normal even after the exudation has become intense. The vessels and air-passages are pervious and little altered. It might be described as intense inflammatory œdema, while the other might be described as croupous inflammation. From the distribution and relations of this clear exudation it appears certain that it is the result of infective action spreading, by means of the lymph-vessels, from the inflamed pleura and along the broncho-vascular system.

On examination of an isolated cone of dense pale induration three important facts become obvious: first, that the air-cells are filled with croupous exudation; secondly, that the bronchial tube and its branches are plugged with a dense, adherent, fibrinous mass; and, thirdly, that all the lymph-vessels around these air-tubes are swollen and turgid, being the seat of a dense, fibrinous exudation. The occlusion of the bronchus and the engorgement of the lymphatics immediately surrounding it must be the cause of the lobular consolidation and the interlobular exudation. This view is borne out by the peculiar localization, the sharp demarcation, and the conical shape. The lymph-plexuses once become the seat of irritating exudation, the spread of the disease is achieved, a chronic destructive inflammation is set up locally from the presence of infective material, which also travels along the lymphatics towards the root of the lung. The inflammatory process, being upon the tributary broncho-vascular systems, chokes their lymph-passages, and thus produces interlobular exudation throughout the territory from which they come. The disease spreads through the lung by means of the peribronchial lymph-vessels on the one hand, and

those under the pleura on the other, the former leading the infective process to the root of the lung, the latter extending it over the surface of the organ.

As to the starting-point in the bronchial mucous membrane, from whence it spreads to the peribronchial connective tissue, it is the least clear of all the process. It is quite possible, Prof. Yeo thinks, that a beast in sniffing the fodder of a diseased neighbor may draw into its air-passages some of the dried discharge, and thus infect its bronchial mucous membrane, and get pleuro-pneumonia; though it is not possible to start it by inoculation under the skin or into the vessels of infective material procured from a diseased lung. Whether there is any special virus which acts as the specific cause of this disease, or not, cannot yet be affirmed: it is left for experimental inquiry to determine. At present no proof exists of such a morphological representative of an infective material. He concludes by saying, "If asked to give a pathological definition of pleuro-pneumonia, I should say that it was a chronic, specific local disease, starting in the bronchi, and insidiously implicating the parenchyma of the lung by occlusion of the bronchi and inflammation extending along the lymphatics; the other organs and the blood possessing a singular immunity from the specific contamination. It is not accompanied by constitutional symptoms, and only gives obscure physical signs. At any time during the progress of the disease its existence may be manifested clinically by the occurrence of complications — acute pleurisy or hemorrhagic infarction with pleural complications —which excite high fever with functional derangements." So much for this careful inquiry, which puts well what we know and what we do not know: still, it is a matter for question whether such inquiry will place us further forward with any treatment that is likely to be operative or not. There is a possibility that such minute observation of morbid processes may, taken along with the light now being thrown on the physiological action of drugs, lead to useful, practical results.

The observations of Gowers and Coats on hydrophobia, that the white blood-corpuscles travel through the walls of the blood-vessels freely, together with those of Binz, that quinine arrests such movements of white corpuscles, have led to the employment of quinine in large doses, together with bromide of potassium, in at least one case of hydrophobia, with the effect that while one of the persons bitten by the same dog has died, a second who was taken ill a few days later was put on this plan of treatment, with the effect that seven days after active symptoms had set in he was not worse, but alive, and even somewhat better. It will not do for me here to allude further to what is being done by the commission to inquire into hydrophobia; but there are good grounds for believing that really valuable results will follow from the present careful examination into the maladies of animals, and those in man caused by animals.

J. Milner Fothergill.

PROCEEDINGS OF SOCIETIES.

PATHOLOGICAL SOCIETY OF PHILADELPHIA.

Thursday Evening, March 14, 1878.

The President, Dr. H. Lenox Hodge, in the chair.

Cystic sarcocele of testis. Presented by Dr. Comegys Paul.

This specimen was removed from No. 8684, a convict incendiary at the Eastern Penitentiary. He is 34 years old, of a scrofulous tendency, but enjoys good health. Fourteen years ago he had an attack of gonorrhœa, during which he slipped and strained himself violently while playing a game of ten-pins. Swelling and pain in the left testicle followed, with which he was confined to his bed for a week. The testicle has never been in healthy condition since, and it has received several injuries from kicks, blows, etc., in the mean time. It has been enlarged and growing slowly during the whole of this period, but has never occasioned much pain, until the last fifteen weeks, when it assumed a dull aching character, which extended to the lumbar region. Because of this excessive discomfort I removed it, with the assistance of Dr. E. C. Hines, on the 7th instant.

He has been in good and comfortable condition since the operation. Two ligatures were required, neither of which has as yet come away.

A case of heart-disease, followed by apoplexy. Presented by Dr. F. Turnbull.

J. L., aged 38 years, laborer, admitted January 24, 1878, to the Presbyterian Hospital. On admission, the following history was obtained. With the exception of slight rheumatism in the right shoulder, he had never been sick until three months ago, when he noticed that while lifting he became giddy and short of breath. He thought he had been obliged to micturate oftener than natural for several years. He also noticed that his feet swelled at night since he had felt unwell. Family history fair.

Examination. — *Heart*, region of cardiac dulness larger than normal. Impulse diffuse. A loud systolic cooing or musical sound; best heard to the outer side of the position of the apex. A less-marked systolic blowing sound,

best heard at the second right intercostal space.

Pulse (radial) weak, and could not be felt when the arm was raised above his head.

Urine, not albuminous.

On the night of the 4th of March he called the night-nurse to him and asked for something to move his bowels, complaining that he had a splitting headache. He was helped into bed by the nurse, who noticed that his legs seemed powerless. The nurse then came to me, saying that the man wanted a cathartic, and I ordered two comp. cath. pills. These were given him, and the nurse left the ward for a minute, but was called back to find the man lying in bed helpless and breathing in a peculiar manner. This was at midnight. I was immediately called, and, on seeing him, found that his breathing was stertorous, the pupil of his left eye dilated and that of his right eye contracted and sluggish. All his limbs except the left arm seemed paralyzed; but on pricking the soles of his feet slight movements of the toes took place.

His pulse was regular, pretty full, and about eighty a minute. His carotids were throbbing. His face was flushed and hot.

About eight ounces of blood were taken from his arm, with temporary relief. Mustard-plasters were applied to his feet, and two drops of croton oil placed on his tongue. At two o'clock A.M. the temperature in the right axilla was 99°; in the left axilla, 88⅘°.

At three o'clock A.M., 102½° in right axilla, and 101⅗° in the left axilla.

He died at 3.40 A.M.

Post-mortem examination. — *Heart.* — Hypertrophy of left ventricle, its walls being ¾ inch thick. The weight of the heart was one pound. The pulmonary valves were about normal. The aortic valves were replaced by vegetations constricting the orifice. The mitral and tricuspid valves were both thickened and contracted. No evidences of pericarditis found.

Lungs.—Old firm pleural and pleuro-pericardial adhesions of right side.

Brain.—On opening the dura mater, a large clot was found between it and the arachnoid, compressing the left hemisphere considerably. It covered the anterior and middle lobes entirely. A smaller clot, also superficial, was found over the anterior lobe of the right hemisphere. There was a small clot, separating the cerebral hemispheres, in the anterior half of the longitudinal fissure.

On examining the base, the clot of the left side was found to extend down in front of the medulla and backwards beneath and above the tentorium cerebelli, so that the two masses of the cerebellum were separated a little by it. The middle and posterior fissure of the skull on both sides contained some of the clot.

The origin of the hemorrhage was found to be in the situation of the left posterior cerebral artery at about the middle of its course. The brain-substance was ruptured at this place. The wound was in the posterior lobe of the left hemisphere, and its opening at the base about two inches in diameter. The pia mater and arachnoid were torn through, and the blood had forced its way into the lateral ventricle of that side, filling it entirely. In the posterior corner of the right lateral ventricle was a small clot which extended anteriorly in diminished size; veins of the surface of the brain congested.

There was a lymphatic tumor of the neck just below the jaw, on the left side, which might have pressed on the jugular veins. It seemed, however, during life to be perfectly movable. It was not thought necessary, at the post-mortem examination, to dissect it.

Case of fracture of the femur in an infant.
Presented by Dr. O. H. Allis.

J. K., eighteen months of age. About two weeks before its death, the mother noticed that the child cried violently when she attempted to put on the right shoe. A week later I saw the child once, and examined the ankle, knee, and hip, and did not detect any unusual symptoms. The child cried, but not worse than when I examined the left limb or the abdomen. The child had a slight cough, was teething, and its urine was dark and turbid. There was no physician in attendance, but just before its death a neighboring physician was called in.

Autopsy twenty-four hours after death. The viscera in the abdominal and thoracic cavities gave no clue to the cause of death. The mesenteric glands were considerably enlarged, and the ribs at their sternal extremities were markedly rounded and enlarged.

On examining the right femur I found a fracture of the neck, with loss of substance, and also a separation of the condyloid epiphysis with the periosteum, separated from the shaft nearly to the middle of the bone. The extremity of the shaft was injected, and there was evidence that blood had been effused beneath the periosteum. There were no traces of inflammatory change, and it is therefore not easy to state at what time the fracture of the neck or the separation of the epiphysis took place. There was, however, abundant evidence that it took place prior to death.

On examining the left limb, the neck of the femur was found to be intact, but a partial separation at the condyloid epiphysis was detected, without, however, any evidence that blood had been effused.

The mother thinks that the origin of the difficulty may be traced to a traumatic injury, viz., to an older sister (one three years old) sitting upon the body and thighs of the babe about two weeks before its death. Had this been the origin of the difficulty, there could scarcely be an entire absence of effort on the part of nature to repair the injury.

REVIEWS AND BOOK NOTICES.

INJURIES OF THE EYE AND THEIR MEDICO-LEGAL ASPECT. By FERDINAND VON ARLT, M.D., Professor of Ophthalmology in the University of Vienna, Austria. Translated, with the permission of the author, by CHAS. S. TURNBULL, M.D. Claxton, Remsen & Haffelfinger, Philadelphia, 1878.

Of the galaxy of ophthalmological stars in Europe, Dr. Ferdinand von Arlt has shone as one of the brightest for many years. Von Graefe, Arlt, and Donders were at one time the great triumvirate that led the world on the subject of ophthalmology. So now anything that is written by Professor Arlt cannot be otherwise than good. The contents of the little book before us, with the above title, are of the first order,—interesting to any physician, whether specialist or not; although to the specialist there is nothing new. We are surprised, however, to see that the eminent author completely ignores the existence of the fine work on Injuries of the Eye, by George Lawson, F.R.C.S., London, 1867; for in a note (p. 14) he says, "I am only acquainted with two [works on Injuries, etc.], that of W. Cooper and that of Zander & Geissle."

The contents are divided into four chapters: the first on compression or concussion of the eyeball, with the different forms of injuries sustained thereby; in which are included contusion of the cornea, rupture of the eyeball, rupture of the inner tunics, dislocation of the lens, etc. Chapter II., on wounds of the eyeball, in which are to be found instructive and interesting articles on foreign bodies in the eye, and the dangerous symptoms of sympathetic ophthalmia. Chapter III., on scalds and burns. Chapter IV., feigned or artificial affections of the eye.

As a general thing, the book is very well translated; but there is the introduction of a few peculiar words which are either obsolete or taken from the German and do not express exactly the same meaning in English, while we have good English words that would answer better.

We are also surprised at the introduction by the translator of the history of a case as a note to page 150, in which he appears to indelicately cast a slur on a *special hospital* and its *staff* and on a *leading oculist* in this city, to the praise of himself. As he is only the translator and not the editor, he is not justifiable in introducing any extraneous matter in the book. If he claims to be the editor also, and the right to introduce other illustrative cases, we regret to see that he has not done his work better, and inserted some of the many interesting and instructive cases that have been published in the journals since Dr. Arlt issued his book.

The book is beautifully gotten up,—good paper and type,—well bound; but the superscription on the back is a great mistake, looking as if it were the work of the translator instead of the author.

The work should be well read, and should be in the library of every physician, for no one knows when he may be called to attend a case of injury to the eye which may require testimony before the courts.

A MANUAL OF OPERATIVE SURGERY. By LEWIS A. STIMSON, B.A. (Yale), M.D. Philadelphia, Henry C. Lea, 1878, pp. 468.

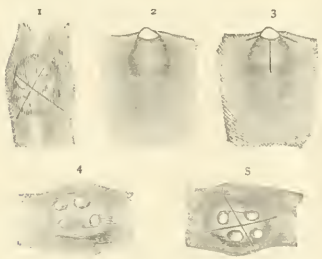
This little book is an excellent condensation of the principal methods in use in operative surgery. The author, who is the translator of Gosselin's Clinical Lectures on Surgery, has avoided the confusion arising from too much minuteness of detail in description condemned by Mr. Syme—quoted in the preface—as "the fiddle-faddle instructions not only for using but even for holding the knife, which sufficiently denote the poverty of the intellect from which they proceed, and the lowness in aspiration to which they are addressed." On the other hand, everything may be found which should be contained in a manual intended for hasty reference on the part of the practitioner and for the use of students. The portions on the ligation of arteries and on amputations are the best to be found in English in any work of the same size, and are exceedingly well illustrated. The defects and omissions are of minor importance. In describing the operations for the radical cure of hernia, no mention is made of Dr. D. H. Agnew's or of Dr. McDowell's methods. Internal urethrotomy is not alluded to, and external urethrotomy is rather insufficiently described. One or two trifling modifications of the operation for phimosis are detailed, but the excellent plan of Dr. Harrison Allen, described by him in this journal, is not included. Of course, however, these and other omissions noticeable in glancing over the book are to a certain extent a necessity of its small size and compactness, and as a whole it may be considered to merit our cordial approval as a creditable addition to this class of books.

GLEANINGS FROM EXCHANGES.

PATHOLOGICAL DENTITION (*The Obstetrical Journal*, April, 1878).—Dr. James W. White, in an article on this subject, calls attention to the significance of the mouth as a seat of pathological change because of its complex structure and associations and its rich nerve-supply, especially during the formative and eruptive period of dentition. Dentition, though a physiological process, is one of continuous irritation, and is subject to deflections which frequently place it in the domain of pathology. Purely normal dentition depends upon an absolute accord between the processes of growth and absorption, as well of the crypt as of the

mucous membrane covering the tooth. Increased pressure, or an advance of the tooth more rapid than the absorption of the superimposed tissues, gives rise to congestion, induration, and ulceration of the gums. The most serious complications in such a case are, however, caused by the backward pressure of the resisting gums upon the nervous and vascular supply of the pulp, giving rise to exquisite pain, fever, nausea, diarrhœa, convulsions, and other serious lesions, many of which, as strabismus or epilepsy, remain throughout life. That this pressure is the cause of such troubles is proven by their prompt disappearance after the gums are lanced. It follows, therefore, that it is not necessary to wait for the appearance of trouble about the gums before resorting to the operation. When this operation is performed, it should be remembered that the object is to remove tension. The cuts, therefore, should be made with special reference to the form of the presenting teeth. The incisors and cuspids need only a division in the line of the arch. The molars require a crucial incision, the centre of the crown as near as can be determined indicating the point of decussation. The cut should reach the presenting surface of the tooth. Partial eruption, especially of the cuspids and molars, does not decide against the necessity for lancing, the conical shape of the former causing a persistence of the trouble, and fibrous bands offering resistance in the case of the molars after the eruption of the cusps. Persistent bleeding, which rarely occurs, may almost always be controlled by powdered alum.

The following cuts represent the incisions which should be made over the different teeth: No. 1, molar; No. 2, partial eruption of a canine; No. 3, the incisions in such a case; No. 4, partial eruption of a molar; No. 5, the incisions in such a case.



Dr. White alludes to the severe suffering often attending the delivery of the lower third molars, especially when they erupt close to or partially under the coronoid process, as they not rarely do, and mentions difficult and painful mastication and deglutition, abscess, necrosis, amaurosis, otalgia, tonsillitis, aphonia, chorea, tetanus, and even death, as among the recorded results. The principle and method of treatment in such cases are the same as in the troubles of infancy arising from pathological dentition. He concludes by advising that at six, at twelve, and at seventeen years of age, or until the wisdom teeth are fully erupted, the mouths of patients suffering from eye or ear trouble, or from any abnormal condition not otherwise explainable, should be inspected, and dentition should be counted as a possible factor.

A Simulated Stigma (*Lancet*).—In the last volume of the Reports of the Vienna Hospital, Dr. Szigmondy relates the case of a young woman who simulated symptoms of the Louise Latour type. She was twenty-two years of age, and strongly built, and an ulcerating scar in the middle of the left hand had resulted from a wound received a year before. It was asserted that every month at the catamenial period the cicatrix opened, and bled for several days. On admission, a superficial ulcer, covered with coagulated blood, lay in the middle of a somewhat larger scar, surrounded by bluish-red staining, which extended over the greater part of the back of the hand. It had the aspect of an old injury, although the patient denied any traumatic influence and attributed the whole to vicarious menstruation. The hemorrhage was going on when the patient was admitted, and recurred during an expected menstrual period. Under treatment the ulcer improved slowly, being transformed into a bright-red, granulating sore; but in spite of every means employed it would not heal. At the time of menstruation, recent hemorrhage was found upon the dressings, although no escape of blood could be detected on watching the open surface. The patient was therefore closely watched to see if with a needle or any other means she produced the bleeding, but without detecting any fraud, although the hemorrhage continued. A plaster-of-Paris bandage was therefore arranged in such a manner as to enclose the whole hand and effectually to prevent any tampering with the wound. It was so secured by other bandages that any attempt at reaching the ulcer would be immediately detected. The ulcer henceforth rapidly healed, and the hemorrhage did not recur. This disposes of yet another of the rare cases of vicarious menstruation.

Treatment of Enlarged Prostate (*New York Med. Jour.*, p. 394, 1878).—Dr. Satterthwaite says it has been found desirable in the practice of the Demilt Dispensary to adopt a method of treatment for enlarged prostate, obviating the use of any instrument, as the patients are generally unable to buy one. A certain amount of relief is obtained by the fluid extract of buchu, or of triticum repens, when the secretion is turbid or acrid; but their efficacy is, of course, slight when unaccompanied by the introduction of the soft catheter. It was his good fortune to try the

effect of the fluid extract of ergot in large doses for these case, she being tempted to do so by the success he had obtained from it in treating a case of simple incontinence without enlarged prostate. The treatment proved successful, and is now a standard one in the surgical department of the Demilt Dispensary. The following case will show how it acted. A laborer, aged twenty, had suffered ten or eleven years from dribbling of urine. His troubles being much aggravated of late, he applied for relief, when a catheter was introduced, relieving his bladder. The patient was at once put upon the fluid extract of ergot in teaspoonful doses, to be taken three times a day. Previously, he had passed water with extreme pain and difficulty seven or eight times a day and from four to five times at night. He experienced great relief from the ergot.

Three weeks later he reported that his water was passed only five times a day and twice at night. The water was clear, and there was but little pain in passing it.

Dr. Satterthwaite says, "In cases where the patient can buy the soft elastic catheter (Nélaton's), it is recommended, with directions to use it twice or three times daily. This treatment may be combined with the use of ergot; but ergot alone has been found of great advantage, the patients returning at regular intervals to have their medicines renewed."

The Intra-Venous Injection of Milk as a Substitute for Blood (*N. Y. Med. Jour.*, May, 1878).—Dr. T. Gaillard Thomas concludes an article on this subject as follows: 1. The injection of milk into the circulation in place of blood is a perfectly feasible, safe, and legitimate procedure, which enables us to avoid most of the difficulties and dangers of the latter operation. 2. In this procedure none but milk from a healthy cow within a few minutes of the injection should be employed. Decomposed milk is poisonous, and should no more be used than decomposed blood. 3. A glass funnel with a rubber tube attached to it, ending in a very small canula, is better, safer, and more attainable than a more elaborate apparatus, which is apt, in spite of all precautions, to admit air to the circulation. 4. The intra-venous injection of milk is infinitely easier than the transfusion of blood. Any one at all familiar with surgical operations may practise it without fear of great difficulty or failure. 5. The injection of milk, like that of blood, is commonly followed by a chill and rapid and marked rise of temperature; then all subsides, and great improvement shows itself in the patient's condition. 6. I would not limit lacteal injections to cases prostrated by hemorrhage, but would employ it in disorders which greatly depreciate the blood, as Asiatic cholera, pernicious anæmia, typhoid fever, etc., and as a substitute for diseased blood in certain affections which immediately call for the free use of the lancet, as puerperal convulsions, etc. 7. Not more than eight ounces of milk should be injected at one operation. 8. In conclusion, I would suggest that if milk answers, not as good, but nearly as good, a purpose as blood under these circumstances, its use will create a new era in this most interesting department of medicine. That it will answer such a purpose, I am convinced from lengthy consideration and some experience of the matter, and I would be false to my own convictions if I did not predict for "intra-venous lacteal injection" a brilliant and useful future.

The Gastric Juice (*The Clinic*, June 15, 1878).—Dr. Charles Richet has investigated the gastric juice in the case of a boy with impermeable stricture of the œsophagus and who had been operated upon by Verneuil. He obtained the following results:

1. The acid of the pure gastric juice, as well as that mixed with nutritive substances, amounted to one part of hydrochloric acid to one thousand of the fluid.

2. At the end of digestion, the acid increases and remains independent of the amount of fluid nutriment taken. Alcohol increases the acidity, cane-sugar diminishes it.

3. After the introduction of acid or alkaline substances into the stomach, the gastric juice always exhibits a tendency to return to the normal degree of acidity.

4. The average duration of digestion is three, at most four and a half hours. The food is not expelled irregularly, as was formerly believed, but as it were *en bloc*. The pylorus opens as soon as the stomach contents have received the proper physical and chemical preparation.

5. Several careful examinations by Schmidt's method demonstrated the free presence of hydrochloric acid in gastric juice.

6. By a certain complicated plan, all the lactic acid contained in the stomach may be extracted, and its proportion to hydrochloric acid is found to be as 1 : 9.

7. By Bertholet's test,—that is, shaking it with anhydrated ether,—it can be shown that lactic acid also occurs free in the gastric juice.

Struma and Syphilis (*The Medical Record*, June 22, 1878).—At the meeting of the American Medical Association Dr. Storer read a paper on this subject, and stated as demonstrable the following propositions:

1. Syphilis, like other toxæmia, was more prone to become constitutional in the strumous than in the perfectly healthy subject.

2. Struma the result of syphilis was comparatively seldom recognized during life, and still more infrequently received appropriate treatment.

3. Syphilitic struma, personal or by heredity, was in no sense self-limited.

4. Predisposition to syphilis by heredity, both of itself and as affected by struma, was much more frequently intense than is generally supposed.

5. Transference of primary syphilis, sometimes by perfectly healthy women who were entirely free from specific disease, was an element not to be overlooked in discussing syphilitic struma.

Dr. Storer believed that a sufficient number of perfectly healthy women could transfer the contagion to keep up the disease indefinitely. He also maintained that consumption was caused by syphilis; that the contagiousness of phthisis was established; that syphilis was never entirely eradicated from the individual; and that it was possible to diagnosticate between syphilis and struma by means of the microscope.

NOTES AND QUERIES.

UNIVERSITY OF PENNSYLVANIA, MEDICAL DEPARTMENT, PHILADELPHIA, June 15, 1878.

TO THE EDITOR OF THE PHILADELPHIA MEDICAL TIMES:

DEAR SIR,—There has come to my notice an anonymous circular entitled "Higher Education in the University of Pennsylvania," which contains statements which are erroneous and misleading. Without going into details as to its contents, its object is to show that the graduate of the Dental Department of the University of Pennsylvania can obtain the degree of Doctor in Medicine "for an expenditure of less money than is exacted from those who matriculate in the Medical Department," and "by attending *two partial courses* in Medicine in the Dental Department and one full course in the Medical Department." The paragraph in the advertisement in the *American Journal of the Medical Sciences* would, perhaps, admit of such interpretation, but it was introduced without due consideration, immediately after the institution of the Dental Department, and before its complete organization. In the announcement of the Dental Department, and on the last page of the third edition of the announcement of the Medical Department, it is stated that the dental student desiring to take the medical degree must inform the Secretary of the Department of Medicine of such intention *at or before the beginning of his second course of lectures*. The object of this is to modify the second course of the dental students so that it may become a full medical course, including Practice of Medicine, Surgery, and Obstetrics, as well as a dental course. The fees for the last two courses have also been altered for such candidates, so that the dental graduate who takes the degree in medicine also pays $475, while the student taking the medical degree only pays $445.

It would have given me pleasure to have explained the matter to the author of the circular had he called upon me in relation to it, thus saving him some trouble and expense.

JAMES TYSON,
Sec. Faculty of Medicine, University of Pennsylvania.

SARATOGA SPRINGS, N.Y., June 19, 1878.

EDITOR MEDICAL TIMES:

DEAR SIR,—The Saratoga County Medical Society, at their annual session, held on the 4th inst., unanimously adopted the following preamble and resolution:

Whereas, There are certain members of the regular profession now in good standing in the State Medical Society, as well as in the county societies, who annually visit Saratoga Springs for the purpose of practising medicine and by their questionable measures in seeking practice to the detriment of local resident physicians, therefore be it

Resolved, That we, as members of the County Medical Society of Saratoga, do condemn the practice above mentioned, as contrary to the spirit of our Code of Ethics.

Very respectfully,
C. C. BEDELL, *Secretary.*

PHILADELPHIA, June 24, 1878.

EDITOR PHILADA. MED. TIMES:

DEAR DOCTOR,—In your report of the proceedings of the American Medical Association during its late session at Buffalo, you refer to the case of goitre stated to have been cured by a single subcutaneous injection of ergot, by Dr. C. N. Palmer, of New York, and state that similar cases were reported by myself. The case presented by Dr. Palmer was, if goitre, of the cystic variety, whereas the one especially referred to by me, out of a number, was a case of fibrous bronchocele. My treatment comprised thirty-nine injections,—thirty minims each,—extending over a period of seven months. From considerable observation, I strongly doubt the cure of the disease by any *rapid* method of treatment, excision excepted. I have had small tumors disappear under electrical treatment in a period of three months, but I do not believe that any method will disperse a growth the size of a large hat, as reported by Dr. Palmer, in the time stated or by the means employed.

Very truly yours,
WM. R. D. BLACKWOOD.

OFFICIAL LIST

OF CHANGES OF STATIONS AND DUTIES OF OFFICERS OF THE MEDICAL DEPARTMENT U.S. ARMY FROM JUNE 16 TO JUNE 29, 1878.

TOWN, F. L., MAJOR AND SURGEON.—Granted leave of absence for eight months, with permission to go beyond sea. S. O. 128, A. G. O., June 13, 1878.

TREMAINE, W. S., CAPTAIN AND ASSISTANT-SURGEON.—Leave of absence extended one month. S. O. 47, Division of the Missouri, June 14, 1878.

BENTLEY, E., CAPTAIN AND ASSISTANT-SURGEON.—Granted leave of absence for one month. S. O. 74, Department of the Gulf, June 12, 1878.

TAYLOR, M. K., CAPTAIN AND ASSISTANT-SURGEON.—Granted leave of absence for one month, with permission to apply for four months' extension and to go beyond sea. S. O. 123, Department of Texas, June 13, 1878. Leave to take effect June 20, 1878. S. O. 128, Texas, June 19, 1878.

HEIZMANN, C. L., CAPTAIN AND ASSISTANT-SURGEON.—To proceed by C. P. R. R., on 10th inst., to Elko, Nev., and report to Capt. Thos. Byrne, 12th Infantry, for duty with his command. S. O. 82, Division of the Pacific and Department of California, June 8, 1878.

GIRARD, A. C., CAPTAIN AND ASSISTANT-SURGEON.—When relieved by Assistant-Surgeon Crampton, to proceed to Fort Keogh, Mont., and report to the commanding officer for duty. S. O. 72, Department of Dakota, June 14, 1878.

CORSON, J. V., CAPTAIN AND ASSISTANT-SURGEON.—Assigned to temporary duty at Fort Whipple, A. T. S. O. 64, Department of Arizona, June 13, 1878.

HALL, J. D., CAPTAIN AND ASSISTANT-SURGEON.—Assigned to duty as Post-Surgeon at Fort Stockton, Texas. S. O. 124, Department of Texas, June 14, 1878.

AINSWORTH, F. C., FIRST-LIEUTENANT AND ASSISTANT-SURGEON.—To accompany Co. B, 8th Infantry, from Fort Whipple to San Francisco, and, upon completion of this duty, return to proper station. S. O. 64, c. s., Department of Arizona.

MERRILL, J. C., FIRST-LIEUTENANT AND ASSISTANT-SURGEON.—Granted leave of absence for one month on surgeon's certificate of disability. S. O. 126, Department of Texas, June 17, 1878.

HALL, W. R., FIRST-LIEUTENANT AND ASSISTANT-SURGEON.—To accompany the troops leaving Fort Canby, June 20, for field service. S. O. 65, Department of the Columbia, June 3, 1878.

CRAMPTON, L. W., FIRST-LIEUTENANT AND ASSISTANT-SURGEON.—Assigned to duty at Fort Randall, D. T. S. O. 72, c. s., Department of Dakota.

SPENCER, W. G., FIRST-LIEUTENANT AND ASSISTANT-SURGEON.—Relieved from duty at Fort Townsend, to proceed to Fort Boise or vicinity, and report to the chief medical officer on duty with troops in the field. S. O. 65, c. s., Department of the Columbia.

Having passed a satisfactory examination before the Army Medical Board, in session in New York City, N.Y., the following gentlemen have been appointed Assistant-Surgeons, U.S. Army, by the President, to date from June 6, 1878, and confirmed by the Senate: Victor Biart, W. W. Gray, Louis Brechemin, and Louis A. La Garde.

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NEW YORK, April 6, 1875.

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Professor of Pathology and Practice of Medicine, University of the City of New York.

LEWIS A. SAYRE, M.D.,
Professor of Orthopædic Surgery and Clinical Surgery, Bellevue Hospital Medical College.

SAMUEL R. PERCY, M.D.,
Prof. Materia Medica, New York Med. College.

F. LE ROY SATTERLEE, M.D., PH.D.,
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Case of Rev. Leroy M. Lee, D.D., of the Virginia Conference M. E. Church South, now of Ashland, Va., formerly the distinguished editor of the Richmond (Va.) Christian Advocate.

[*Extract from letter dated Buffalo Lithia Springs, Oct.* 18, 1876.]

"In 1859 or '60 my attention was first attracted to probable disease of my bladder or disorder of my urinary organs. It grew on me until it became a trouble of daily and nightly life. I have never passed a stone or gravel, or "brickdust" in color or matter. I have never been conscious of symptoms such as physicians ascribe to diseases of the kidneys; I have no experience of "incontinency of urine," instead, a too copious secretion, and an almost constant flow of urine. Under the mental excitement of composition, I have left my desk once eighteen times in five hours. Going to bed at twelve o'clock, I have left it sixteen times before seven o'clock in the morning. For the last ten years I have obeyed the call nightly from eight to twelve times. Under such circumstances my sleep has been in strips, until *now, for more than twelve years,* I have been a stranger to "Tired nature's sweet restorer, balmy sleep." By night, loss of sleep and deprivation of rest; by day, trouble, embarrassment, and inconvenience have worn out my health, and filled my life with bitterness and sorrow. With this disease in full play, I reached the Springs on the 11th day of August. I came here depressed and dejected, almost without hope as to any better condition of health; my body emaciated, my strength exhausted, and my feet clinging to the ground. Judge of my present state by facts: I sleep well for hours; am called up, for the last fortnight, seldom more than three times, one night only twice; I rest well, and awake refreshed and strengthened, "rejoicing as a strong man to run a race"; I am nearly as full-fleshed as when a young man twenty years of age; my step is elastic, and I can walk two or three miles a day without fatigue."

HÆMATURIA.

Statement from Dr. E. M. Campbell, Abingdon, Va., a member of the State Medical Society.

MR. THOS. F. GOODE. ABINGDON, VA. Nov. 9, 1875.

Dear Sir,—My attention having been attracted by an advertisement of the Buffalo Lithia Springs Water, I was induced to prescribe it for *the most aggravated case of Hæmaturia that I have ever seen.*. A few bottles of the water produced a complete cure. I regard these waters as especially valuable in affections of the kidney and bladder. Very respectfully, E. M. CAMPBELL, M.D.

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After the life of the patient had been despaired of by his medical attendant.

[*Extract from letter of Dr. T. B. Greer, of Rocky Mount, Franklin Co., Va., of June* 3, 1876.]

"I have recently had occasion to try the Lithia Water in a case of *inflammation* and *ulceration* of the bladder, caused by retention of urine, the result of stricture of twenty years' standing. I had exhausted all of the resources, both of experience and authority, without relief: and when my patient commenced the use of it, had no hope of his recovery. He has been using the water five weeks, with results so favorable that he now has every prospect of complete recovery, and, without some unexpected change in his condition, will be on his feet in a short time. The effects of the Water in this case have been marvellous. For the sake of humanity I shall keep a record of the case, and report to you as it advances."

In a subsequent communication from Dr. Greer, referring to the above case, he says, "In the case of inflammation and ulceration of the bladder, heretofore reported, the patient recovered; and I attribute the recovery entirely to the Lithia Water."

The waters in cases of six gallons, five dollars per case at the Springs. Springs open first day of June. Springs pamphlet sent to any address. Both water and pamphlets may be had of JOHN WYETH & BRO., 1412 Walnut St., Philadelphia.

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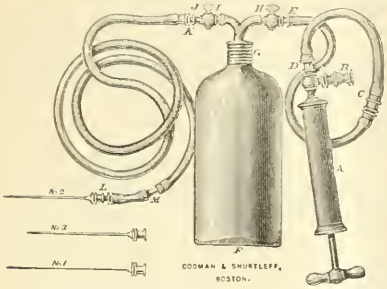
FIG. 63.



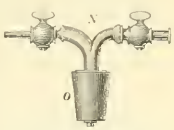


FIG. 69. The Stopper and Cocks supplied with apparatus No. 2.

1st. Means of changing the pump from an exhaust- to a force-pump, and *vice versa*, thereby enabling the operator not only to withdraw an abnormal fluid, but to inject the cavity through the tubes and needle of the apparatus with one adapted to induce healthy action.—*See Dieulafoy on Aspiration*, pp. 276, 278.

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A. E. MACDONALD, M.D., Professor of Medical Jurisprudence.
JOSEPH W. HOWE, M.D., Clinical Professor of Surgery.
LEWIS A. STIMSON, M.D., Professor of Pathological Anatomy.

THE COLLEGIATE YEAR is divided into three sessions,—a Preliminary Session, a Regular Winter Session, and a Spring Session.

THE PRELIMINARY SESSION will commence September 18, 1878, and will continue until the opening of the Regular Winter Session. It will be conducted on the plan of that session.

THE REGULAR WINTER SESSION will commence on the second of October, 1878, and end about the first of March, 1879.

The location of the new College edifice being immediately opposite the gate of Bellevue Hospital, and a few steps from the ferry to Charity Hospital, Blackwell's Island, the Students of the University Medical College are enabled to enjoy the advantages afforded by these Hospitals with the least possible loss of time. The Professors of the practical Chairs are connected with the Hospitals, and the University Students are admitted to *all the Clinics* given therein, *free of charge.*

In addition to the daily Hospital Clinics, there are eight Clinics each week in the College Building. Five Didactic Lectures will be given daily in the College Building, and Evening Recitations will be conducted by the Professors of Chemistry, Practice, Anatomy, Materia Medica, etc., Physiology, Surgery, and Obstetrics, upon the subjects of their lectures.

THE SPRING SESSION embraces a period of twelve weeks, beginning in the first week of March and ending the last week of May. The daily Clinics, Recitations, and Special Practical Courses will be the same as in the Winter Session, and there will be Lectures on Special Subjects by the Members of the Post-Graduate Faculty.

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STUDENTS WHO HAVE STUDIED TWO YEARS, and who have attended two full courses of Lectures, may be admitted to examination in Chemistry, Anatomy, and Physiology, and, if successful, will be examined at the expiration of their full course of Study on Practice, Materia Medica and Therapeutics, Surgery, and Obstetrics; but those who prefer it may have all their examinations at the close of their full term.

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MEMBER OF THE AMERICAN MEDICAL COLLEGE ASSOCIATION.

SESSIONS OF 1878-79.

THE COLLEGIATE YEAR in this Institution embraces a preliminary Autumnal Term, the Regular Winter Session, and a Spring Session.

THE PRELIMINARY AUTUMNAL TERM for 1878–1879 will open on Wednesday, September 18, 1878, and continue until the opening of the Regular Session. During this term, instruction, consisting of didactic lectures upon special subjects and daily clinical lectures, will be given, as heretofore, by the entire Faculty. Students expecting to attend the Regular Session are strongly recommended to attend the Preliminary Term, but attendance during the latter is not required. *During the Preliminary Term clinical and didactic lectures will be given in precisely the same number and order as in the Regular Session.*

THE REGULAR SESSION will begin on Wednesday, October 2, 1878, and end about the 1st of March, 1879.

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JAMES R. WOOD, M.D., LL.D.,
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FORDYCE BARKER, M.D.,
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A distinctive feature of the method of instruction in this College is the union of clinical and didactic teaching. All the lectures are given within the Hospital grounds. During the Regular Winter Session, in addition to four didactic lectures on every weekday except Saturday, two or three hours are daily allotted to clinical instruction.

The Spring Session consists chiefly of Recitations from Text-books. This term continues from the first of March until the first of June. During the Session daily recitations in all the departments are held by a corps of examiners appointed by the Faculty. Regular clinics are also given in the Hospital and in the College building.

FEES FOR THE REGULAR SESSION.

Fees for Tickets to all the Lectures during the Preliminary and Regular Term, including Clinical Lectures,	$140.00
Matriculation Fee	5.00
Demonstrator's Ticket (including material for dissection)	10.00
Graduation Fee	30.00

FEES FOR THE SPRING SESSION.

Matriculation (Ticket good for the following Winter)	$5.00
Recitations, Clinics, and Lectures	35.00
Dissection (Ticket good for the following Winter)	10.00

Students who have attended two full Winter Courses of Lectures may be examined at the end of their second course upon Materia Medica, Physiology, Anatomy, and Chemistry, and, if successful, they will be examined at the end of their third course upon Practice of Medicine, Surgery, and Obstetrics only.

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The experience of this Asylum for the past ten years indicates an increasing usefulness and necessity for such institutions, and the original intention of making this an Asylum Hospital, where this disorder may be thoroughly understood and treated on broad scientific principles, is nearer realized than ever before. All rules are strictly enforced, and no patient permitted to go beyond the Asylum grounds without permission from the Superintendent, or in the care of an attendant.

The charges will include medical care, washing, lights, fuel, etc., with ordinary attention. The exigencies of each particular case will be acted upon as it may present itself, to those of moderate and limited means as well as the rich.

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